SCIENCE AND INDUSTRY

Contractors and Engineers Monthly

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Highlights Of This Issue

- **Defense Construction**

  One of the most important phases of the National Defense Program is the improvement and enlargement of civil airports under the CAA program. Among these projects is the Fargo, N. D., airport where the runway construction consists of base stabilization with portland cement and a hot-mix surface. Another article in our defense construction series describes a new defense highway in Canada. See pages 1 and 2.

- **Flood Control Project**

  The Lake Traverse-Bois de Sioux flood-control and conservation project is designed to protect towns on the Minnesota and North Dakota border from floods as well as to conserve flood waters in Lake Traverse. Two phases of this project, channel excavation on the Bois de Sioux River and the construction of White Rock Dam, are described in this issue. See page 2.

- **Traffic Striping**

  The South Dakota Highway Department has developed an effective unit and organization for placing center and warning stripes on its highways, producing a clean straight line with speed and minimum interference with traffic. See page 2.

- **County Road Work**

  Operating on the basis that money spent for construction provides greater returns in the long run than that paid out in perennial maintenance, Jackson County, Iowa, is carrying on a steady well-planned program of construction done by contract. This and other phases of work in Jackson County are discussed in this issue. See page 7.

- **Winter Concreting**

  With emphasis on continued construction for defense, the problem of winter concreting will face many more contractors this year than ever before. How this problem was handled last winter in the construction of a concrete flood wall, a part of the Binghamton, N. Y., flood protection project, is described in this issue. See page 11.

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Soil-Cement Runways For Airport at Fargo

SNOW REMOVAL IN OREGON

Opening the Timberline Lodge Road in Oregon. See page 17.

McCree & Co., St. Paul, Minn., Uses Traveling Mixer With Success to Speed Work On Large Operation

(*Photos on page 40*)

✦ HECTOR Field, the Municipal Airport of Fargo, N.D., is undergoing a rapid expansion as one of the 200 air fields selected by the Civil Aeronautics Authority for improvement under the National Defense Program. Soil-cement runways on specially compacted shallow fills provide the major innovation. Nature provided an ideal location for the airport, at the bottom of Lake Agassiz of glacial times, flat as any airport engineer could desire, but the area is totally devoid of any of the required materials of construction. Fill material of suitable character to place over the slow-draining silty clay, known geologically as Fargo clay, had to be hauled 14 miles from several pits to the east near Sabin, Minn., with a fleet of trucks on one-minute headway 16 hours a day, and clay for the stabilized lifts for the foundation and shoulders of the soil-cement runways was hauled 2 miles from pits at South Fargo.

Because of the importance of the work, trucks and other motor vehicles engaged in this work display red metal signs with black lettering, "Fargo Airport-National Defense". This permitted them at the start to go through the special stop and warning signs which have been placed at all intersecting highways. However, the failure of other traffic to respect these signs led to the necessity of requiring the hauling trucks to make the regular stops at all points where other traffic was also required to stop.

Expansion Program

The original Hector Field, the land for which was donated to the city by its most civic-minded citizen, Martin Hector, consisted of 160 acres to which has been added five 1/16 sections one year ago and a fifth, also to the north of the original port, during the winter of 1941. The original airport had a NW-SE runway 3,400 feet long and 80 feet wide on a cinder fill overlaid by a 4-inch stabilized base and a 2-inch bituminous surface with a 1-foot crown. In addition to this, there was a N-S runway, 2,500 feet long and 80 feet wide with a cinder surface and a NE-SW runway similar in length and width to the NW-SE runway, but with a cinder surface. All of the taxiways were of cinder construction.

The present expansion program under the Civil Aeronautics Authority, with construction supervised by the U.S. En-

(*Continued on page 18*)

Lake Traverse Project

Flood Control and Conservation Project On Border of Minnesota and the Dakotas

Channel Excavation on the Bois de Sioux for 24 Miles By Megarry Bros.; Contractor Moved 4,500 Yards Daily

(*Photos on page* 40)

✦ LAKE Traverse, which forms the northeast border of South Dakota with Minnesota, is one of the largest duck breeding areas in the United States. The very flat character of the terrain is a potential flood hazard to Minnesota and North Dakota towns along the shores of the Bois de Sioux River which drains the area, uniting with the Ottertail River at Breckenridge, Minn., to form the Red River of the North which flows into Hudson's Bay.

About two years ago a major flood-control and water conservation project was started by the U. S. Engineer Department under the direction of the District Office at St. Paul, Minn., to provide: (1) an adequate channel for the Bois de Sioux River for 24 miles from Lake Traverse; (2) a dam with a control structure at the north end of Lake Traverse to impound flood waters in the lake; (3) a dike on Minnesota Highway 117 with a control structure at the Minnesota-South Dakota line to conserve water levels in Lake Traverse during periods of normal and subnormal run-off; and (4) a dike at the south end of Lake Traverse on the Continental Divide between the Mississippi River watershed and the Red River of the North to prevent the waters of the lake flowing south when the elevation of the surface is raised approximately 3 feet above normal. A short article in this series describes the operations on each of these divisions of the project.

Channel Dredging Contract

Only a small part of the channel excavation was channel change, amounting to between 10 and 15 per cent and occurring mostly at curves. The excavation generally followed the existing channel except for a few cut-offs. The channel section is 60 feet wide at the bottom with 1 on 3 slopes and a 20-foot berm from the top of the slope to the toe of the spoil bank. The spoil bank is continuous on the west side, or left bank, of the excavation for 14 miles, forming a levee section with openings at natural drainage points. The top of the dike section rises 18 feet above the bottom of the channel with the cut averaging about 11 feet and the dike about 7 feet high. The specifications required that the spoil banks be made with a 2 on 1 slope on the channel side, with no specified slope for the far side. The excavation was through a very flat wide valley with about 2 feet of black top-soil underlaid by clay with some sand, gravel and hardpan pockets.

C. & E. M. Photo
White Rock Dam at the north end of Lake Traverse in Minnesota.

The total fall from White Rock Dam to the end of the project 24 miles north is 14.11 feet, with the grade for the first 90,000 feet being 0.01 per cent and from there to the north end of the project it is 0.014 per cent. This amounts to a fall of about ½ foot per mile. The design provided for a maximum curvature of 15 degrees.

Equipment and Production

Work on the channel excavation was started by Megarry Bros. of St. Cloud, Minn., on April 15, 1940. Work continued 24 hours daily, with the omission

(*Concluded on page* 22)

White Rock Dam Maintains Conservation Pool and 9-Foot Flood Storage; the Work Subbed by Contractor

✦ THE 3-mile White Rock Dam of the Lake Traverse-Bois de Sioux flood-control and water conservation project is at the north end of the lake about 7 miles northwest of Wheaton, Minn., and maintains a conservation pool in the northern or Mud Lake section and also makes available about 126,000 acre-feet of flood storage. The contract was awarded to Martin Wunderlich Co. of St. Paul, Minn., and the work was done entirely under subcontracts as follows: earth embankment and concrete structure with Taintor gates, Adolphson & Huseth of Thief River Falls, Minn.; sand and gravel toe drain and gravel blanket under riprap, Cosh Bros. of Herman, Minn.; and riprap and derrick stone, Anderson & Wunderlich of St. Paul, Minn. The total completed cost of White Rock Dam amounted to $229,-685.53.

The 3-Mile Dam

The 3-mile dam or dike is 26 feet wide at the top, with slopes of 1 on 2½ up-

(*Concluded on page* 23)

Highway for Defense Opens New Territory

Ontario Highway Improved To Serve New Gold Mining Section to be Linked in the Trans-Canada Highway

✦ A MEANDERING highway which followed old lot and concession lines in northern Ontario took on great importance when gold was discovered at Kirkland Lake and Timmins. Then, when it was deemed a necessary defense measure to undertake the completion of the unbuilt link in the Trans-Canada Highway between Hearst and Geraldton, Ontario, the northland highway, No. 11, took on even greater importance. The section of Highway 11 running north from the Ontario Department of Highways Division Headquarters at New Liskeard has been greatly improved, at a gross cost of $50,000 to $75,000 per mile, including the right-of-way.

Work was started in 1937 with a big development program in this district to serve the gold mining areas. At first only a 100-foot right-of-way was taken, but there was found to be insufficient room for the 1 on 3 slopes which were deemed the steepest which could be built and still provide a safe highway. Following this, the right-of-way was widened to a maximum of 250 feet, but the largest portion of it is 150 feet wide. Cultivated land in this area has an average value of $75 per acre.

Excavation and Grading

This section of Ontario abounds in a very unstable clay, so that in the extension of improvements to Highway 11 much of the excavation was done in winter when the clay was frozen, so that the trucks could work in the cuts and also on the dumps. On one fill, about 1,000 feet in length and a maximum of 25 feet high, on a side hill, it was necessary to load the toe of the fill with gravel to keep it from sliding. This is typical of many of the fills in this section, some of them being completed with sand because in the spring, when the clay thawed out, the fills spread. Generally the tops of the fills have been stabilized with gravel, so that the trucks could drive over them during the widening of the fills before all of the clay had thawed.

At the end of grading, a drainage trench is excavated on either side of the area to be paved. At first this was done after the paving had been completed, but it was found that the trench was likely to break off at the top, thus weakening the pavement. This trench, 2 feet wide and around 4 feet deep, when filled with screened gravel from which all of the fines have been removed, gives a 2-foot gravel shoulder next to the road, providing excellent drainage. The earth shoulders are then continued 8 feet beyond the gravel, with a slope of 6 inches in 10 feet. The ditch slopes are both 3 to 1. Because the clay is exceedingly difficult to handle in seeding, it is neces-

(*Concluded on page* 36)

C. & E. M. Photo
The new Bois de Sioux River channel, showing the spoil banks and berm.

C. & E. M. Photo
The striper stops a moment to pose.

Truck-Mounted Unit For Center Striping

South Dakota Highway Dept. Has Developed Effective Machine for Center and Warning Stripes on Roads

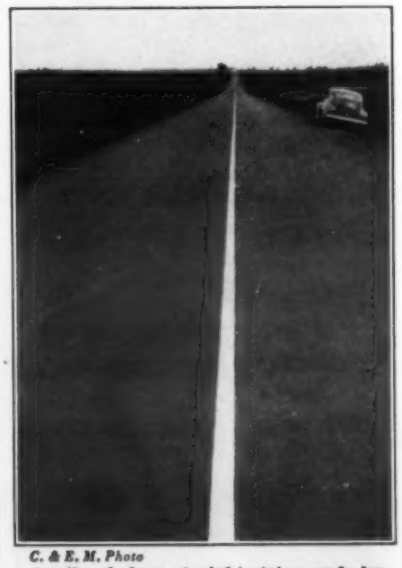
(*Photos on page* 40)

✦ SAILING down the road at 10 miles an hour, the truck-mounted center striper of the South Dakota Highway Commission delivers a straight line of uniform width and strength. The three men making up the crew on the truck are intensely interested in doing the job right, to aid the traveling public. There is no funny business, such as was portrayed in a cartoon in a recent issue of *The New Yorker*. A long straight road stretches out before one's eyes in the cartoon, totally devoid of traffic. In the mid distance is a roadside stand. Leading from the foreground to the building is a center stripe as straight and true as ever was sprayed. Beyond is a series of badly inebriated variations of a straight line.

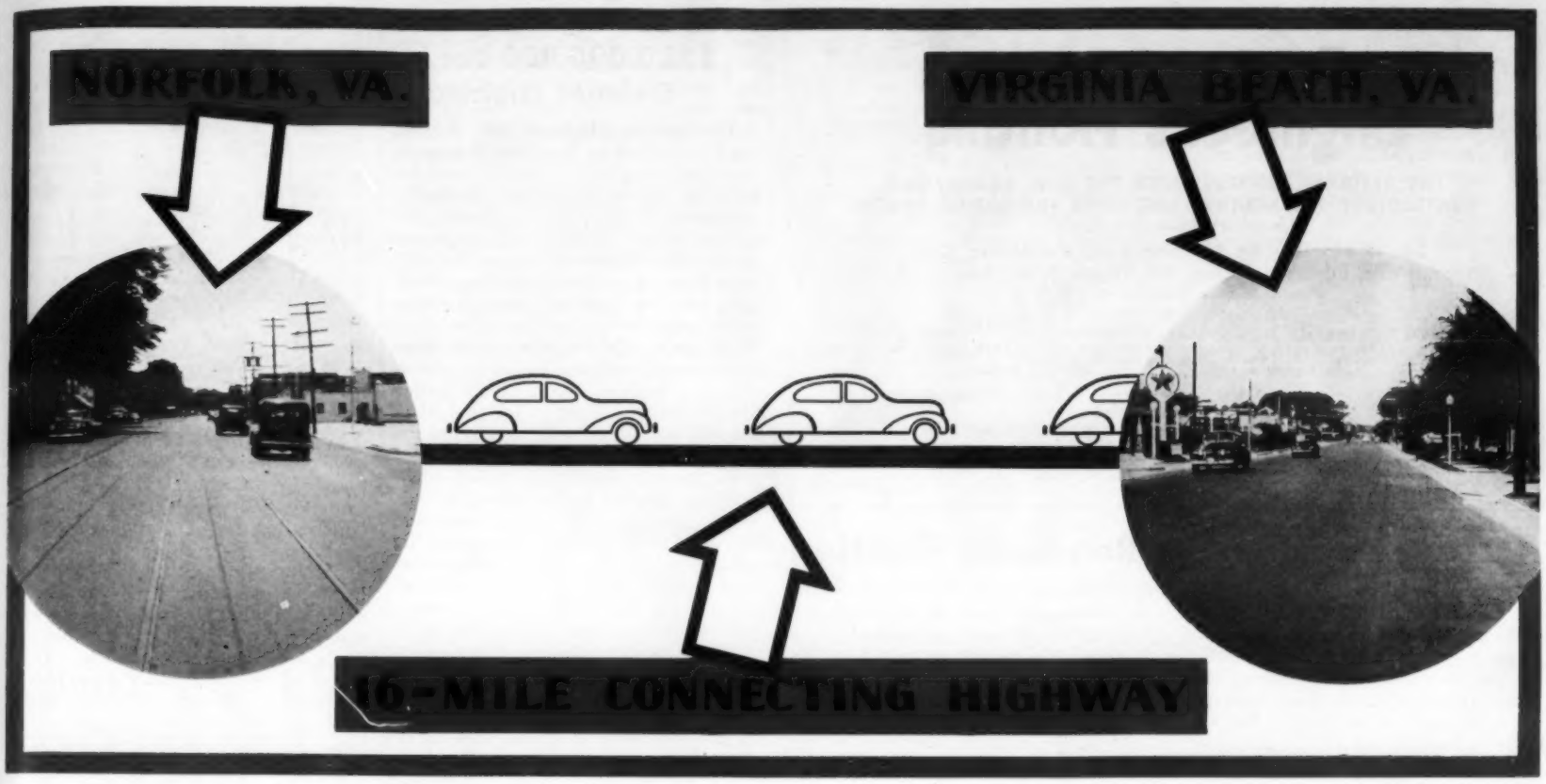
The Paint Mixer

On a standard South Dakota highway truck which makes up the base unit of the striping outfit is mounted a garage compressor which furnishes air to two tight containers of 60-gallon capacity for white paint and 25-gallon capacity for yellow paint. Mounted adjacent to the compressor is a 55-gallon oil drum in which are paddles which are driven from the engine of the compressor by a belt, which drives also a similar stirring

(*Concluded on page* 13)



C. & E. M. Photo
A mile of clean straight stripe made by the S. D. maintenance truck.



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CONTRACTORS AND HIGHWAY ENGINEERS AND COMMISSIONERS

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A Traveler Looks at Roadside Planting

During eleven weeks of traveling in the mid and northwest from Michigan to the Dakotas and Nebraska, and return, we made some pertinent notes commenting on the roadsides we have seen. These refer only to those roadsides where obviously some attempt has been made to improve them.

The attractive roadside tables and small rest areas in Michigan and Ohio are outstanding, with an approved water supply at each and toilet facilities of a cleanly nature provided at many of them. In Michigan, practically all roadside parks are equipped with running water from artesian wells and have toilet facilities furnished in a clean, well-uesigned rustic shelter. The old oaken bucket, illustrated on this page, is an example of one of these sanitary water supplies, given charm and atmosphere by its design and construction. Underneath is a flowing well, and the cistern, bucket and rustic structure were built over it. The rock work representing the old-time cistern is, of course, "scenery". The water is piped up from the well below through the barrel, with a bubbler arrangement on the bucket. Leading up from the well is a water tap for those who wish to fill their jugs or buckets at this source.

When it comes to the grading and planting of the roadside, we noted the particularly attractive flat slopes in Michigan which were seeded or, if steeper than 4 to 1, sodded to prevent erosion. The varied widths given to the scene ahead take away the monotony of a long tangent, and any possibility of artificiality of a fine sloping lawn of grass leading directly into a rather wild ground cover has been changed by Nature herself scattering the seeds of bush, tree and shrub down the slope in that pleasing informal manner which only Nature can assume.

Elsewhere we noted equally attractive grassy slopes but where some well-meaning local amateur landscaper had planted small pines or saplings in line or very carefully and artificially scattered over the slopes. This utterly ruined the charm and naturalness of the setting, has cost money, and done no good. It merely increased mowing costs by making it necessary to mow by hand rather than by machine.

In the comparatively few years since roadside development has been an important factor in highway work, great progress has been made in making our roadsides safer, more attractive and more economical to maintain. Under present circumstances, it appears that some of this work will be curtailed in order to devote the energies and finances of the highway departments to even more urgently needed defense-highway construction. However, we must not lose our appreciation of the importance of roadside development, but remember, more than ever before, that roadside development in its entirety must lead to safety and economies in maintenance through the years to be acceptable.

Engineer Appointed To Arbitration Panel

Announcement has been made by the American Arbitration Association of the appointment of William M. Piatt, consulting engineer of Durham, N. C., to the National Panel of Arbitrators of the Association. Mr. Piatt, a specialist in the field of engineering, has for the past few years been engaged largely in designing and supervising municipal public works. Since 1931, he has been consultant to the National Resources Planning Board.

In order to expedite the settlement of any disputes which might delay the fulfillment of national defense contracts, the American Arbitration Association is adding to its National Panel throughout the country.

SMALL ROADSIDE AREAS THAT SERVE TAXPAYER AND TOURIST

Road Bill Signed; $220,000,000 for Defense Highways

The Defense Highway Bill, S-1840, has been signed by President Roosevelt, thus becoming a law, and provides $220,000,000 for road work. As finally approved, the authorizations of this bill are as follows: $150,000,000 for access roads; $25,000,000 for use on the strategic network, to be allocated in accordance with the regular Federal Aid formula and matched by the states on a 75-25 basis; $25,000,000 for the strategic network without regard to allocation and matched on a 75-25 basis; $10,000,000 for flight strips; and $10,000,000 for plans and surveys, to be matched on a 50-50 basis.

Of greatest significance to the road-building industry in the signing of this bill is President Roosevelt's statement regarding it. He protests that some of the authorizations are for non-essential work, setting forth the construction of access roads and flight strips as necessary for defense, but considers the work on the strategic network of secondary importance. In addition, he protests vigorously against the fact that $25,000,000 of the total $50,000,000 for work on the strategic network is to be allocated in accordance with the Federal Aid formula, a formula, Mr. Roosevelt says, "that disregards what should be the sole objective of this legislation, that of providing highway construction in those areas only, where there is immediate need of such construction in the interest of our national defense." Apparently Mr. Roosevelt is less well informed on the condition of the strategic network than he should be, for a survey of state highway departments conducted last spring by CONTRACTORS AND ENGINEERS MONTHLY, (the results of which were published in our March issue), indicated that there was essential work to be done on the strategic network in every state in the country.

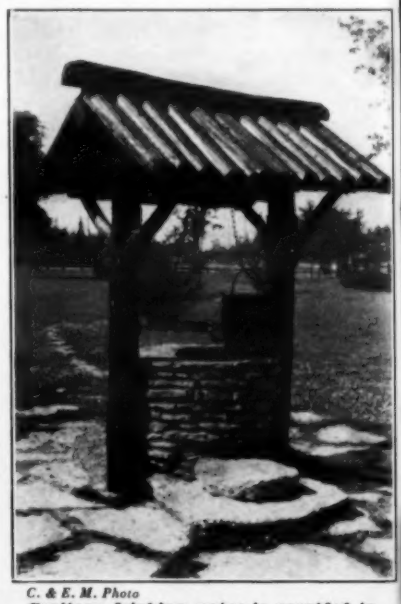
President Roosevelt ended his letter on this subject by saying, "I wish, nevertheless, to express my earnest hope that the Congress may find early occasion, in studying our national defense needs and the ways and means of meeting them, to eliminate from this enactment the authorizations to which I have directed attention as not representing immediate requirements for our national defense."

This presents a definite challenge to the highway industry, not only to fight for an adequate highway system, but to aid in educating the public and the lawmakers alike in the legitimate and real needs of our highway system. Those interested in good roads must not be led by their zeal into a failure to distinguish between the actual needs for defense, and the needs to make our highway system the ideal one which we should like to see. The welfare of this country must, in this present emergency, precede all else, and first things must come first.

The serious threat to the industry and our highway system lies in the general ignorance on our real highway needs, and it is up to the highway industry through a public relations and educational campaign to see to it that the public knows what those needs are and supports action for meeting them.

"Lookit! Dames—maybe!"

A feature of many Michigan roadside parks is the comfort stations which are well designed rustic shelters, clean, modern and sanitary.



C. & E. M. Photo
Sanitary drinking water is provided in most Michigan roadside parks. In this one a simulated old-fashioned well and bucket provide atmosphere as well as pure water.

C. & E. M. Photo
A roadside park in Michigan on the shore of Lake Superior, one of many attractive places of rest scattered throughout the state for the comfort and pleasure of the traveling public.

C. & E. M. Photos
A typical wayside table just west of Iron Bridge, Ontario, installed by the Ontario Department of Highways, and the simple rustic sign telling the traveler he is approaching a wayside turnout and place to picnic.

Barber-Greene Celebrates Twenty-Fifth Anniversary

On October 21, 1941, the Barber-Greene Co. of Aurora, Ill., celebrated the twenty-fifth anniversary of the founding of the company, marking the occasion by a banquet and the issuance of a most interesting anniversary booklet containing a history of the company, photographs of its founders and present officials, as well as descriptions and illustrations of the line of Barber-Greene construction equipment.

Founded by Harry H. Barber and William B. Greene during the first World War, the Barber-Greene Co. is now playing an important role in the second one. Its bituminous mixers and finishers, bucket loaders, conveyors, and ditchers are being used extensively not only in our own defense-construction program but abroad as well, in war and construction activities.

Speaking of the future of the company, Ashley Barber, son of one of the founders and an active officer in the company, said, "We have only started. The opportunities ahead are unlimited —opportunities for individuals to grow and opportunities for the organization to grow in an ever greater service to the world's progress through 'Barber-Greene Tomorrow' ".

A limited supply of the Barber-Greene Silver Anniversary Booklets is available for those requesting them.

New B-K Vice President

The Blaw-Knox Co., Pittsburgh, Penna., announced recently the appointment of Robert T. Harris as Vice President of its Blaw-Knox Division, in charge of the Construction Equipment Department, in view of the widened scope and responsibilities incidental to administration of this department.

Automatic Dragline Buckets

A new descriptive bulletin "Your Dragline CAN Move Dirt Faster," describing the Page automatic dragline bucket and how it is designed to increase your payload, has recently been issued by the Page Engineering Co., Dept. A-31, Clearing Post Office, Chicago, Ill. This line of Page buckets includes sizes from 3/8 to 15 cubic yards in capacity, in three weight groups, to provide the right type of bucket for every job.

Copies of this new bulletin may be secured direct from the manufacturer.

DEFENSE won't wait for weather!

• *Under a scorching sun this "Caterpillar" Diesel No. 12 Motor Grader windrows dirt for airport construction at Felton Field, Pensacola, Florida.* ⬇ *Dual engine cooling keeps both water and oil at the proper temperature.*

In THE first nine months of 1941 the men and machines of America's far-flung earth-moving industry have dug, scraped, hauled and bulldozed more than 800,000,000 cubic yards of dirt and rock — all on defense work! And all moved in record time.

The fact that much of this immense yardage has been handled under the toughest kind of conditions is a tribute to the rugged power, traction and stamina of "Caterpillar" Diesel Tractors and Motor Graders. These sturdy machines ask no favors of terrain or weather. In deep, soft mud, on sun-baked clay or frozen ground, they come out slugging, right from the bell. They have what it takes.

• *At the U. S. Army Proving Grounds, Aberdeen, Maryland, a "Caterpillar" Diesel D7 Tractor with LaPlant-Choate bulldozer works in heavy March mud.* ⬇

The broad steel tracks of a "Caterpillar" Diesel Tractor furnish solid footing for its tremendous engine power, and the final drive is protected from mud, water and grit by copper bellows-seals. Balancing engine weight over the drive wheels gives a "Caterpillar" Diesel Motor Grader its unbeatable tractive power. Both machines start fast and run smoothly whether the temperature is zero or 100. And both operate with better-than-average Diesel economy because they use the cheaper grades of fuel.

Most important of all, *they're built to stand up under punishment* — day and night, month after month, with a minimum of lost time.

Every minute counts in the present emergency, and "Caterpillar" dependability has a vital part in licking America's biggest job.

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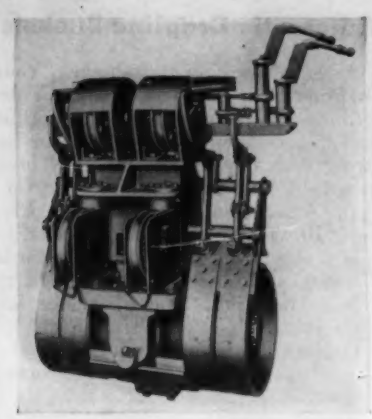


New control levers on the Buckeye Model HD power control unit for tractor-mounted equipment.

New Hoist Control

An improvement in the design of the control levers and linkage on Buckeye Model HD heavy-duty power control units for Allis-Chalmers, Cletrac and Caterpillar tractors has been announced by the Buckeye Traction Ditcher Co., Findlay, Ohio.

This change incorporates horizontal control levers which are placed within easier reach of the operator. Better leverage is secured and operation is simpler and more positive, the manufacturer states. The fair lead swivel sheaves have been lowered, thus bringing the direct line pull closer to the tractor drawbar to achieve better tractor balance. The complete control lever and linkage assemblies are interchangeable with the older style mechanisms and are available for replacing them.

Further information on these new control assemblies may be secured by interested contractors and engineers direct from the manufacturer or from this magazine.

Arc Welders and Accessories

A new 38-page catalog describing the complete line of Hobart Simplified arc welders and accessories has been issued by Hobart Brothers Co., Box CE-91, Troy, Ohio. One of the outstanding features of these arc welders is the Multi-Range dual control which, according to the manufacturer, makes it easy for the operator to adjust volt-ampere relationship to such degree as may be required by practically any welding application and for the use of all electrodes. Such fine adjustment makes possible one thousand combinations of voltage and current. This feature and others are described in detail and graphically illustrated, and complete data are given on Hobart arc welding accessories such as shields, electrode holders, protective clothing, Hobart electrodes, etc.

Copies of this catalog may be obtained direct from the manufacturer.

High *in* Capacity — Light *in* Weight

BRAND NEW PUMP

New 30M MARLOW Self-Priming Centrifugal Pump; 4 cylinder, 15 hp. LeRoi air-cooled engine. Superlative performance.

MARLOW PUMPS RIDGEWOOD NEW JERSEY

Dump-Body Equipment Described in New Book

A new Data Book on the line of Hercules dump bodies and equipment for Dodge trucks has just been issued by the Hercules Steel Products Co., Galion, Ohio. Included in the equipment described and illustrated are the Tire and Tool Pack dump body, Center-Lift hoists, the panel-side dump body, braced-side rub rail body, the straight-side dump body, the Eze-Reach tail-gate control lever, a cement box for bulk cement, a variety of hydraulic hoists and of dump bodies to meet special requirements, split shaft power take-offs, welder and compressor units for truck mounting, and the Cretemobile, a complete mobile truck unit for the application of Gunite.

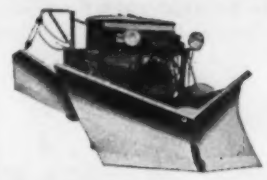
The book also contains formulae for the determination of load distribution and dump-body length, truck performance tables, a comparison chart of body sizes, a table of the physical properties of various metals used in truck-body construction, tire data, and a list of Hercules dealers throughout the country.

Copies of this new Data Book, Catalog No. 18, may be secured by interested contractors and state and county highway engineers direct from the manufacturer by mentioning this item. Similar data books on equipment for use with Ford trucks, and on Dodge and Fargo export chassis, are also available.

New Pioneer Dealers

The Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis, Minn., manufacturer of quarry and gravel-pit machinery, announced recently the appointment of the E. F. Craven Co., Greensboro, N. C., and James Ray Norton, 11 West 42nd St., New York City, as new Pioneer distributors in those states.

For FASTER - SAFER - CLEANER SNOW REMOVAL



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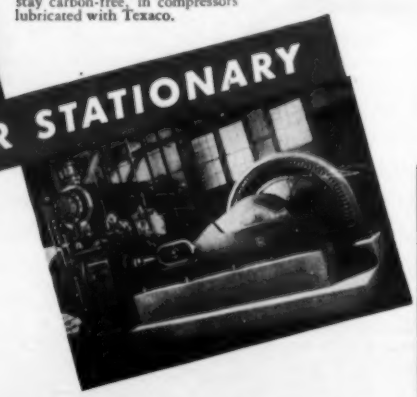
PORTABLE OR STATIONARY



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Using *Texaco Alcaid, Algol or Ursa Oils* the little carbon that may form will be *soft* and *fluffy* . . . will be carried away with the compressed air. Highly resistant not only to carbon formation, but also to gumming and sludging, these oils assure efficient valves, longer service between inspections and cleanings.

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These Texaco users enjoy many benefits that can also be yours. A Texaco Lubrication Engineer will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distributing plants in the 48 States, or write:

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FOR ALL CONTRACTORS' EQUIPMENT

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for National Defense.

Construction Is Stressed On County Highway System

C. C. Bowman, Road Engineer Of Jackson County, Iowa, Has Program That Will Produce Savings Through the Years

EVEN with a small quota of snow plowing equipment, Jackson County, Iowa, is able to keep its trunk roads open in winter, after the wind dies down, because of its continuing program of road construction to a well-designed cross section. The entire county trunk system of 69.67 miles will be completed to grade and graveled in 1942 and work is starting on the more important county local roads in the 766.87 miles that serve the 648 square miles of the county.

A Question of Policy

Jackson County spends a larger proportion of its funds for construction than is usual in county highway departments, and this applies even with the transfers permitted from the construction funds to the maintenance funds in emergencies, such as for snow removal or after floods. C. C. Bowman, County Highway Engineer, when interviewed in his office in the Jackson County Court House Annex in Maquoketa, Iowa, stated very emphatically, "If you put money into the construction of better county roads, you can see your money there ten years later. But if you put it all into maintenance, the money is gone in one year."

This is especially applicable in the case of snow plowing. Snow plowing is a maintenance operation and it must go on year after year, fighting the snow drifts in the same places, unless construction is resorted to, to streamline the cross section and raise the grade so that the very wind that piles up snow drifts on poor cross sections will work for you on the streamlined sections and clear the snow from the traveled way without the need of snow plows. Enough road has been constructed to grade and streamlined on the trunk roads of Jackson County to prove definitely the value of this policy. The saving in snow plowing and in the cost of erecting, removing and storing snow fence will, in a matter of several years, pay the entire cost of new construction, according to Mr. Bowman.

All new grading to the streamlined cross section and the construction of bridges is done by contract in Jackson County. The county forces attend to maintenance, and to construction on the less important local roads.

County Road Standards

All county trunk roads and the more important local roads are being built on an 80-foot right-of-way with a 28-foot road bed having a 6-inch crown. A slope of 2 to 1 is used for fill slopes and 3 to 1 on the fore slope in cuts, with a minimum 8-foot ditch sloping away from the road at 25 to 1. The back slopes are varied so as to leave at least 2 feet between the right-of-way line and the top of the slope in cuts for utility poles, and 5 feet is left where a 3-phase line is installed. When the distance from the center line to the top of the cut is 38 feet, a 1½ to 1 backslope is used. If borrow is needed, the slopes are laid back to as much as 4 to 1, going into the farmer's fields and then replacing his fence on a line 40 feet from the center line of the highway. This greatly improves the cross section, gives the desired streamline to minimize windbreaks, and improves the appearance of the highway and roadsides.

C. & E. M. Photo
Convenience and comfort in welding at the Jackson County central repair shop.

Highway Funds

Construction funds for the use of the County Highway Department come from a property tax administered by the county which produces about $20,000, and from its receipts from the state gas tax returns, based on the relation of the area of the county to the area of the entire state, amounting to $72,748.49. In

(*Concluded on page* 35)

BARTLETT
TREE PAINT

For the protection and healing of wounds after pruning, use Bartlett Tree Paint. Easily applied with ordinary paint brush. Will not freeze.

Used by U.S. Government, State Highway Departments. Tree Experts, Parks and Cemeteries. — $1.50 Gal. Can; $5.50 5-Gal. Drum. F.O.B. Detroit

Bartlett Mfg. Co., 3035 E. Grand Blvd., Detroit, Mich.

ROCK is no TOUGHER today than in 1895

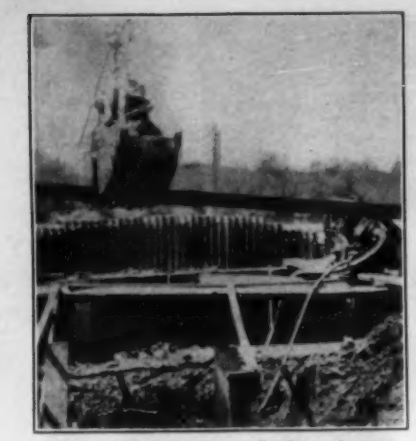
● You can't do the same thing for 46 years and not learn a lot about it—and Thew started to learn about rock shovels in 1895, when the first Thew was produced.

Though rock is no tougher today than in 1895, Thew-Lorain rock shovels are! The new, modern 2-yd. Lorain-82 pictured below typifies the latest in Thew's long line of rock shovels. It's a vast improvement over the "old timers," shown above, in power, strength, speed and output. It's but one of the many current Lorains that reflect the value of this 46 years' experience . . . a value which they demonstrate in today's terms by digging more rock, faster, at lower cost.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN
Rock Shovels
1895-1941

THEW CENTER DRIVE



Excavation behind a cofferdam of Armco interlocking sheeting, driven through clay, sand and decayed logs, in the Wahkiakum Drainage District No. 2 in the state of Washington.

Corrugated Sheeting Light, Easy to Handle

One of the features of Armco corrugated sheeting for trenches, cofferdams, cut-off walls, dikes, bulkheads, foundations and similar uses is its sturdy yet light-weight construction, making it easy to handle and drive. This Armco sheeting may be used over and over again, the number of times depending, of course, on the character of the soil in which it is used and the care with which it is handled. To help increase the service life of the sheeting, the use of a driving head is recommended to help protect the ends from damage.

Because of the many uses to which steel sheeting is put, there is a need for several types to meet varying conditions. Accordingly Armco provides three different types: interlocking, clip, and flanged. The interlocking type is used primarily where water-tightness is desired, for permanent installations, and also for temporary installations where soil conditions are favorable. The clip type of sheeting is provided with locking clips electrically welded at about 4.5-foot intervals along one edge. These clips engage the plain edge of the adjacent sheet and lock the two together, making the sheeting semi-water-tight. This type has the advantage of allowing the units to be interlocked from the side by rotating one sheet through a 90-degree arc. Armco flanged-type sheeting is particularly adaptable for sheeting trenches. The flanges can butt against each other or alternate sections can be reversed so that the flanges hook over each other. This type of sheeting can be driven to full penetration before excavation is started. Also this type of sheeting has a high salvage value as it can easily be pulled and re-driven.

Armco corrugated sheeting of the interlocking type comes in units 14 inches wide and of the clip and flanged types in units 12 inches wide. The standard lengths are in multiples of 2 feet up to 18 feet. The sheeting is supplied in 12, 10 and 8-gage, and varies from 6 to 13¾ pounds per square foot. It is stated that the smooth metal units of relatively small cross-sectional area displace very little material and readily penetrate most soils with a minimum of driving effort. They can be driven by hand or by light power hammers.

A folder on Armco corrugated sheeting, describing it and its many uses, has been prepared by the Armco Drainage Products Association, Middletown, Ohio, and copies may be secured by interested contractors and state and county highway engineers direct from the Association or from member companies, by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Using Shot and Grit In Core Drill Work

As a result of its extensive studies of steel shot and grit abrasives, the National Metal Abrasive Co., 3560 Norton Road, Cleveland, Ohio, recommends No. 13c shot and No. 12 steel grit for core drilling operations and for road coring. Using a mixture of shot and grit does the work better than either one alone, because the shot mixed in with the grit gives a ball-bearing action, enabling the core-drilling machinery to turn more readily so that the grit has a chance to cut more effectively. If grit were used alone there would be a tearing action and the core-drilling machinery would tend to stall.

A new booklet on controlled abrasives has recently been issued by the National Metal Abrasive Co., which contains a very complete description of the difference in action between shot and grit in various types of work. Copies of this book, "The ABC and XYZ of Controlled Abrasives", will be sent free to readers of CONTRACTORS AND ENGINEERS MONTHLY writing direct to the manufacturer and mentioning this item.

BEST by EVERY MEASURE

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Suction and Discharge Hose

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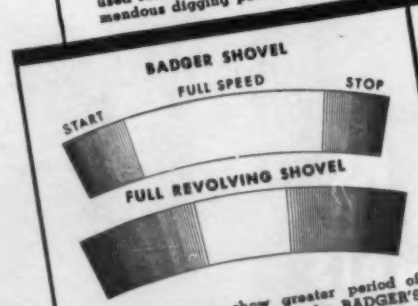
2. S. 26th St., Philadelphia, Pa. (New York, Boston, Pittsburgh, Chicago, Houston and other principal cities.)

WITH A 3/4 SWING BADGER ON THE JOB

The BADGER'S level full measure is exactly 12 cubic feet. From top of teeth to back of dipper it measures 13-1/2 cubic feet. Heap measure gives a capacity in excess of a full half yard.

The single line maximum pull of the BADGER is 10,000 pounds. Thus the three part line used results in a 30,000 pound pull . . . tremendous digging power.



Diagrams above show greater period of FULL SPEED provided by the BADGER'S faster start and stop. This extra period of full speed is possible because the BADGER has no excess load to be brought to full speed, stopped and reversed within the limits of a short swing.

● Every feature of conventional shovel design that is an obstacle to speed and output has been eliminated in building the A-W BADGER.

Size of dipper . . . digging speed . . . speed in swinging . . . low center of gravity that makes it possible to use 15 tons of upward pull for ripping through any material . . . ALL contribute to the BADGER'S amazing output.

An investigation will demonstrate conclusively that no full-swing shovel can approach the BADGER on these output-increasing points. Yet the BADGER 1/2-yard Shovel is priced lower than many 3/8-yard shovels. See it perform as a shovel, dragline, trench hoe, pile driver or skimmer before you buy. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.

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AEROIL BURNER CO., Inc.
6778 Park Ave., West New York, N. J.

Montana Highway 89 Rebuilt, Modernized

6-Mile Section Relocated, Graded to Stop Drifting Of Snow; Road-Mix Surface, By Albert LaLonde Co.

+ ALWAYS in sight of the majestic Rocky Mountains, Montana Trunk Highway 89 meanders in a leisurely diagonal through some of the state's best cow country over the 125 miles which lie between Browning, trading center of the Blackfeet Indian Reservation at the east entrance to Glacier National Park, and Great Falls, second largest city of the state and the location of the Anaconda Copper Co. refinery and many other of the state's foremost industries. Not only is the route extending south from Great Falls a "bee-line" between Yellowstone and Glacier National Parks but, extending north through Browning, it is a vital link, on the protected eastern slope of the Continental Divide, with our neighbor Canada.

Like many of the older highways in the western states, T. H. 89 when originally built followed old wagon and cattle trails, veering from the most direct course to provide access to small settlements, and adding more mileage to the road by avoiding steep grades over the foothills.

Last summer the Albert LaLonde Co. of Sidney, Montana, completed the regrading, rebuilding and placing of a 31-foot road-mix surfacing on a 6.004-mile stretch of Trunk Highway 89 south of Choteau, known locally as the Choteau-Sun River Road. Originally a bituminous-surfaced road varying in width from 18 to 20 feet and flanked through level country on either side by deep narrow ditches, this section of T. H. 89 was rebuilt to modern standards. The LaLonde contract was comprised of more new alignment than rebuilding, and by following a direct route cuts off one mile from the point where the new highway leaves the old road to its juncture with the original route at the other end of the project. The village of Bole, with a population of 20, through which the old road ran, is completely bypassed by the rebuilt route.

The rebuilt section of T. H. 89 extends straight as an arrow's course over the range land in the direction of Sun River from Choteau. Built up above the level of the surrounding country, winter winds from the summits of the mountains will find no ditches to fill with drifting snow, but instead will sweep the new highway clean, as there are no cuts, no fills, and no ditches to trap the snow—only the new grade rising well above the surrounding land.

Grading Operations

LaLonde's grading operations over the 6-mile stretch were simple ones. On either side of the road at the start of the new grade were located two borrow pits from which the 220,230 cubic yards of subgrade fill were taken. Although the location of the borrow pits at one end of the contract meant a maximum haul of slightly more than 6 miles, the contractor compensated for the distance by using six 10-yard trucks. The subgrade fill was hauled to the grade and laid directly on the range grass.

At the pits, an old Osgood 1½-yard shovel loaded to the trucks. Although far from new, this shovel was maintained in top-notch mechanical condition and kept the trucks moving with scarcely a hitch or delay. The trucks used were Chevrolets equipped with Thornton 10-wheel drives and Anthony hoists and bodies. Not only were the 10-yard capacities especially desirable on this job where the haul was so long, but the weight of the load distributed over the ten pneumatic-tired wheels assisted greatly in compacting the subgrade.

The subgrade fill, of a sandy-clay consistency, was spread over the 40-foot shoulder-to-shoulder width of the new grade by a Caterpillar No. 12 road patrol and a D8 tractor with a LeTourneau 8-yard scraper. The compacted subgrade, watered and rolled, was covered with a 2-inch top course of well-graded gravel, compacted in place. For the entire job, the subgrade fill totaled 220,230 cubic yards, the base course 38,233 tons of crushed gravel and the top course 19,195 tons of the graded gravel.

Preparing Surfacing

Where the old road had a bituminous-surfaced wearing course from 18 to 20 feet wide, the new grade has a surfaced wearing course 31 feet wide. Although, when this job was visited this summer, the contractor was still engaged in grading operations and had not yet set up his screening and crushing plant for the production of gravel, this work was started late in the summer and completed in the autumn. The road-mix treatment consists of stone chips and binder soil mixed with SC-4 asphalt. A tack coat of SC-2 was applied, and then a seal coat of 95-penetration asphalt. The contract required 118,130 gallons of SC-4 asphalt, 7,438 gallons of SC-2 for the tack coat, and 40,590 gallons of 95-penetration asphalt for the seal coat.

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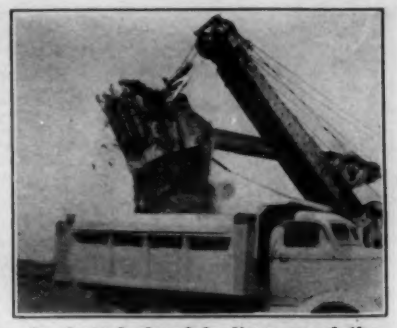
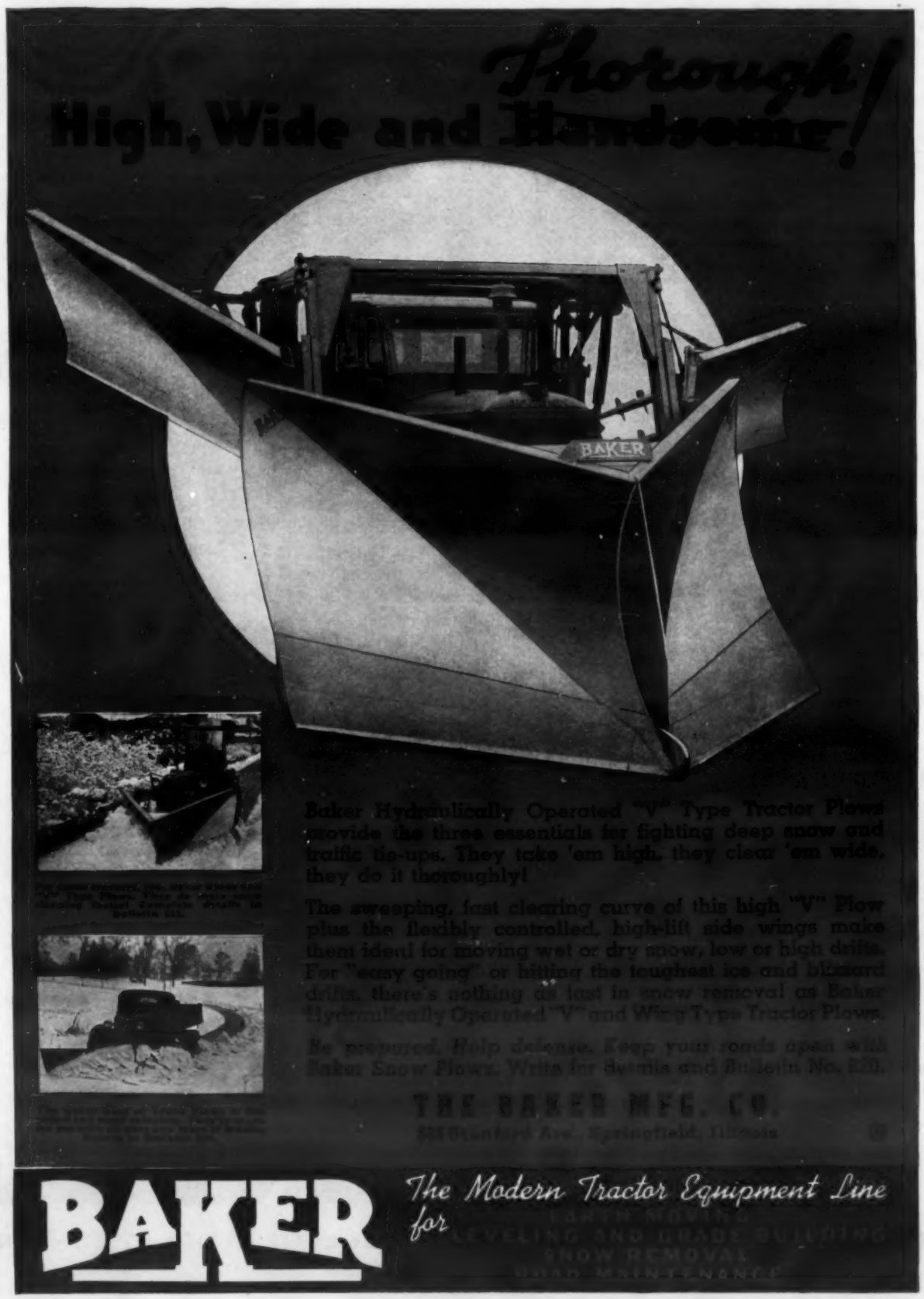


An Osgood shovel loading one of the Chevrolets with Thornton drive and 10-yard Anthony body which hauled fill from the borrow pit.


Thorough!
High, Wide and Handsome!
BAKER
Baker Hydraulically Operated "V" Type Tractor Plows provide the three essentials for fighting deep snow and traffic tie-ups. They take 'em high, they clear 'em wide, they do it thoroughly!
The sweeping, fast clearing curve of this high "V" Plow plus the flexibly controlled, high-lift side wings make them ideal for moving wet or dry snow, low or high drifts. For "easy going" or hitting the toughest ice and blizzard drifts, there's nothing as fast in snow removal as Baker Hydraulically Operated "V" and Wing Type Tractor Plows.
Be prepared. Help defense. Keep your roads open with Baker Snow Plows. Write for details and Bulletin No. 520.
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A Mixermobile furnishing concrete for a state highway viaduct in Portland, Ore.

New Concreting Unit Completely Portable

The Mixermobile for handling concreting on bridge foundations or piers, concrete walls, viaducts, pipe lines and similar jobs is a complete portable combination of three units, including the loading device, concrete mixer, and hoist, all operated by one man. With a road speed of 30 to 45 mph, the Mixermobile can be set up on the job in less than half an hour, it is stated.

A loading skip receives the aggregate and cement for a 2-yard batch from the batch truck and empties them into the mixer which is equipped with an automatic water meter for accurately measuring the water for the mix. When mixed the required time, the batch is delivered to the hoist bucket which raises it to the tower hopper from which it is delivered to the forms. While one batch is thus being delivered, a second batch is in the mixer, and a third is being dumped into the loading skip, so that continuous mixing and delivery of concrete is made at a rate up to 40 cubic yards an hour.

Power for the unit is furnished by the V8 motor of the Ford truck on which it is mounted, and all replacement parts are Ford stock items. Other features of the Mixermobile include SKF bearings throughout, a special 40-gallon gasoline tank, a lock timer with alarm gong, automatic batch counter, and one 10-foot and a 5-foot tower extension.

A folder describing the Mixermobile and illustrating its use on a wide variety of jobs may be secured by those interested direct from Mixermobile Co., Inc., 915 Wm. Fox Bldg., Los Angeles, Calif., if in the West, or from Equipment & Supplies, Inc., 622 Second Ave., Pittsburgh, Penna., if living in the Eastern section of the country.

Oil-Burning Heaters For Construction Jobs

The line of Aeroil oil-burning heaters, burners, torches, salamanders, asphalt kettles and pouring pots and similar equipment for use in road and winter construction is described and illustrated in a new 80-page complete catalog just issued by the Aeroil Burner Co., Inc., 5775 Park Ave., West New York, N. J.

The equipment covered in this new catalog, which is a handy pocket size, includes the various models of the Aeroil Heet-Master, other types of asphalt kettles, both power and hand sprays, patch kettles, patrol and maintenance heaters, tool heaters, surface heaters, squeegees, torches, furnaces, melting pots, emulsion sprayers for curing concrete, concrete mixer heaters, paving tools, salamanders for winter construction jobs, thawing outfits, tar and asphalt pots, tool boxes, weed burners, and accessories, as well as reflector buttons, and traffic and warning signs.

Copies of this new catalog No. 200R may be secured by interested contractors and state and county highway engineers direct from the manufacturer or from this magazine.

Woven Wire Screen Cloth For Vibrating Screens

Wherever screening, sizing, dewatering, or similar operations are carried on, efficiency and economy largely depend on the selection of the right types of screens and screen cloth. Bulletin No. 113, recently issued by the Robins Conveying Belt Co., 270 Passaic Ave., Passaic, N.J., contains a list of factors that are important when selecting the proper screen cloth. In addition, a page is devoted to the metallurgy of Robins screen cloth wire, another to important specifications and data, and several types of screen are described and illustrated with close-up photographs showing the design.

Copies of this bulletin may be obtained by writing direct to the manufacturer and mentioning this item.

RED DEVIL
LIGHT
and POWER PLANTS
800 to 50,000 WATTS

3,000 WATT
as illustrated on Pneumatic Tires
$395.00

Finish the job quicker and save money with electricity.

Send for catalog describing generators and our complete line of portable poles for floodlighting.

E. B. KELLEY CO., Inc.
43-47 Vernon Blvd.
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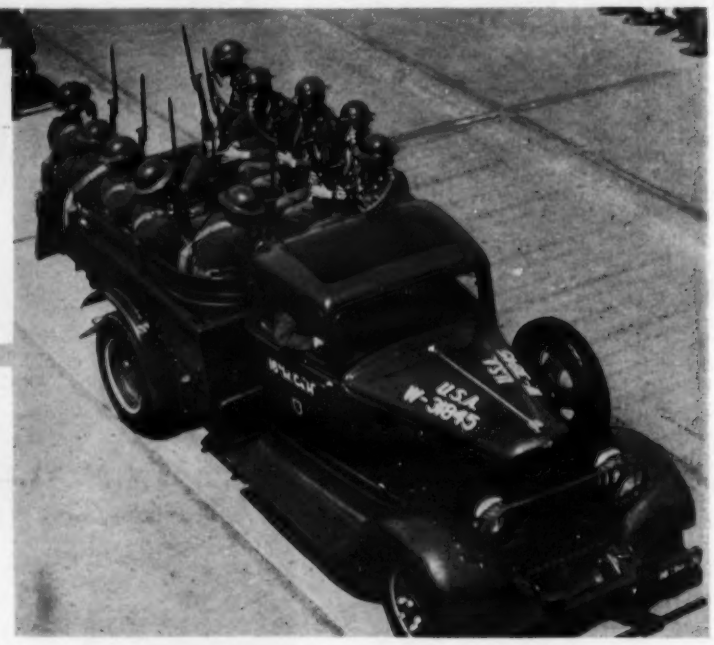
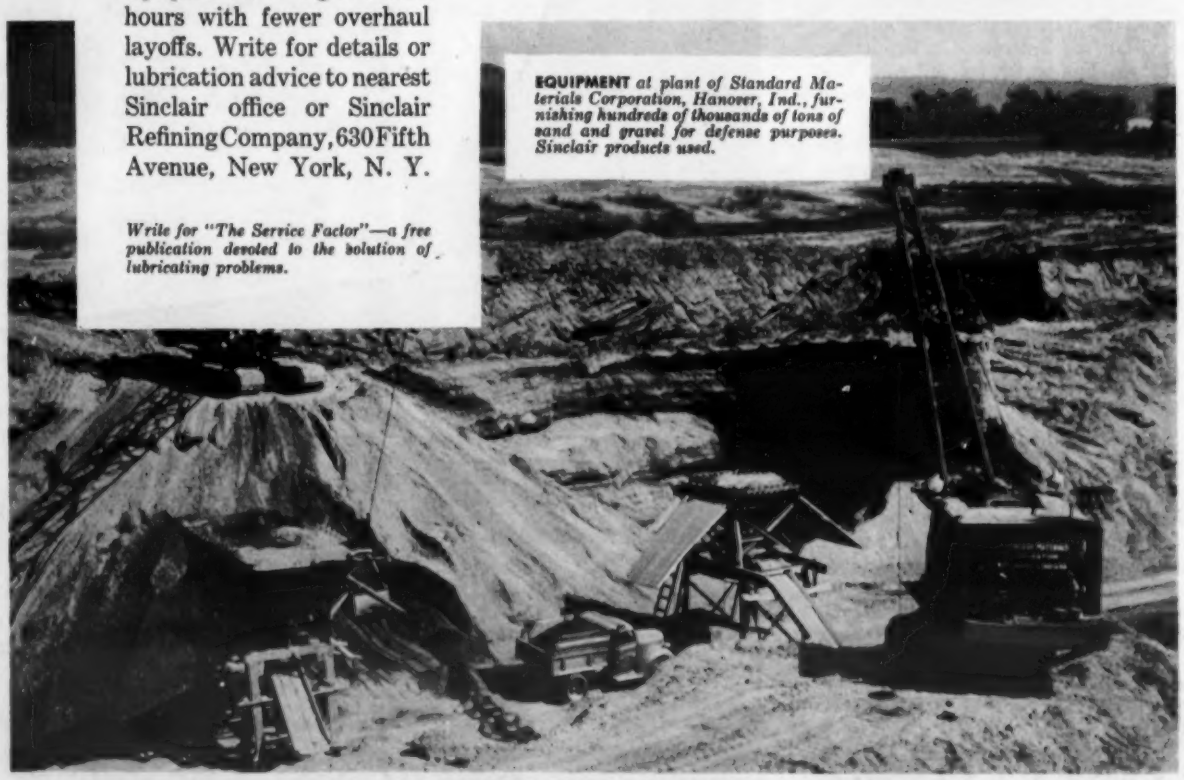
DEFENSE URGENCY demands extreme performance. *Correct* lubrication keeps machinery standing up in continuous all-out service. For *CONSTRUCTION EQUIPMENT* there are . . .

. . . SINCLAIR OILS and GREASES specially developed to provide non-failing lubrication under the most punishing operating conditions. Try these *correct* lubricants in hard-worked equipment for longer service hours with fewer overhaul layoffs. Write for details or lubrication advice to nearest Sinclair office or Sinclair Refining Company, 630 Fifth Avenue, New York, N. Y.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.





EQUIPMENT *at plant of Standard Materials Corporation, Hanover, Ind., furnishing hundreds of thousands of tons of sand and gravel for defense purposes. Sinclair products used.*

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SINCLAIR REFINING COMPANY (Inc.)

2540 West Cermak Road, Chicago · 10 West 51st Street, New York City · 1907 Grand Avenue, Kansas City · 573 West Peachtree Street, Atlanta · Fair Building, Ft. Worth

Winter Concreting Of River Flood Wall

L. B. Strandberg & Son of Chicago Used Steam Unit Heaters Within Tarpaulin Housing at Binghamton, N.Y.

+ THE feature of Section 3 of the Binghamton, N.Y., Flood Protection Project was the handling of winter concreting. The $93,971.10 contract of L. B. Strandberg & Son of Chicago, Ill., was only 1,623 feet in length and included jacketing 971 feet of old wall, the pouring of 537 feet of T-section wall, and 115 feet of cantilever wall on steel sheet piling.

The work done during the winter of 1940-41 was chiefly jacketing an old gravity section wall. The concrete was purchased heated from a local producer and delivered in truck mixers. The entire length of wall being jacketed was housed with tarpaulin to give a cross section of 150 square feet, sufficient for the carpenters and concrete men to move readily. The outside temperature during the work never went above freezing and did go as low as — 3 degrees. A low-pressure boiler was installed and hand-fired to furnish steam to American Blower Corp. Venturafin unit heaters placed every 30 feet. These were soon changed to 40-foot spacings as the temperature ran too high within the enclosure. The specifications required a temperature range of 50 to 70 degrees for winter curing, but it ran nearer 60 at all times, making the operation comfortable throughout the winter.

Every 60 feet in the top of the tarpaulin housing, a section 20 feet long and 3 feet wide was inserted with Cel-O-Glass as a skylight, thus saving greatly on the electric bill for lighting.

Mixed Own Concrete

During the winter it was much more economical to purchase truck-mixed concrete from the local producer, but when business for the producer increased and traffic in the streets also increased, there were numerous delays in the arrival of the trucks and then the demurrage on the trucks if held at the job more than 15 minutes made it more economical for the contractor to install his own concrete-mixing plant. This was particularly true as during the spring and summer it was not necessary to heat the water or aggregates for the concrete.

The concrete plant consisted of a Smith 14-S mixer, with batching from stockpiles on the street being done with wheelbarrows weighed on a Fairbanks wheelbarrow scale. This outfit readily produced 10 cubic yards of concrete per hour and at no time was called upon to operate throughout an entire working day because of the nature of the pours. All concrete on the T-section wall was poured in alternate 25-foot sections, which was optional under the specifications, but was better for the contractor inasmuch as it spread out the carpenters and the concrete crew so they did not get in each other's way.

Runway for Buggies

The maximum distance that the concrete was buggied was 550 feet for which five Red Star concrete buggies with pneumatic tires were used. The runway was substantial and of adequate width for one buggy, with turnouts for passing without danger of either running off the side. The posts for supporting the runway were 4 x 4's with 2 x 10 stringers and 3 x 8 floor beams laid flat and 2 x 10 decking. The runway was placed high enough for each lift so that the buggies could be dumped direct into metal hoppers with elephant-trunk chutes attached.

The concrete wall, in the 25-foot sections, was built with a key at the end of each section which was painted with asphalt paint before the pouring of the adjacent section. Expansion joints of ½-inch compressed cork were used only at changes in alignment of the wall.

The tarpaulin enclosure for winter concreting of a river flood wall on the L. O. Strandberg contract at Binghamton, N. Y.

Driving Sheet Piling

The Bethlehem steel sheet piling used as the cut-off for the flood wall was driven by a McKiernan-Terry No. 7 steam pile hammer in swinging leads operated by an Erie steam crane. A special set of guides of 12 x 12 timber was made to insure proper alignment of the adjacent piles.

The backfill adjacent to the wall was placed in 6-inch layers and compacted by three passes of a tractor weighing not less than 14,000 pounds. In the places

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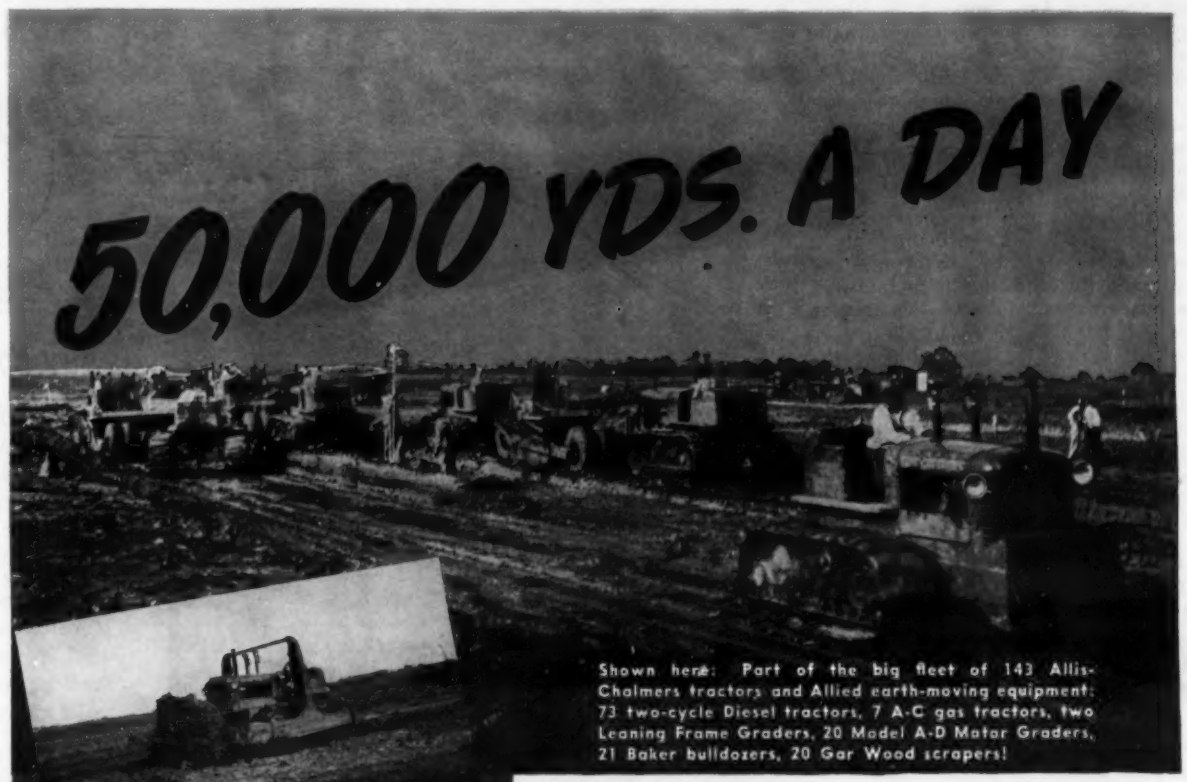


Shown here: Part of the big fleet of 143 Allis-Chalmers tractors and Allied earth-moving equipment: 73 two-cycle Diesel tractors, 7 A-C gas tractors, two Leaning Frame Graders, 20 Model A-D Motor Graders, 21 Baker bulldozers, 20 Gar Wood scrapers!

W. E. Callahan Co., assembles huge array of tractors, shovels, trucks, graders and other earth-moving equipment to rush huge defense project.

BIG is a one-word description of what's taking place on the Southwestern Proving Ground, ordnance project, Hope, Arkansas. BIG the way Uncle Sam does it . . . and BIG the way W. E. Callahan Construction Company is doing it. Over 4,000,000 cubic yards are being moved . . . at the astounding daily average of 50,000 yards. 70,000 yards scored one day! The huge undertaking is being rushed through by "an array of equipment that rivals the claims of some highly touted mechanized armies".* A major part of the big mechanized force are Allis-Chalmers and Allied manufacturers' equipment. 143 UNITS! 73 TWO-CYCLE DIESEL TRACTORS, 7 A-C GAS TRACTORS, TWO LEANING FRAME GRADERS, 20 MODEL A-D MOTOR GRADERS, 21 BAKER BULLDOZERS, 20 GAR WOOD SCRAPERS! On 24-hour duty . . . hitting a fast, steady pace . . . they're out for a record in time and cost . . . and are setting it!

*** According to the Public Relations Director of the Hope Project.**

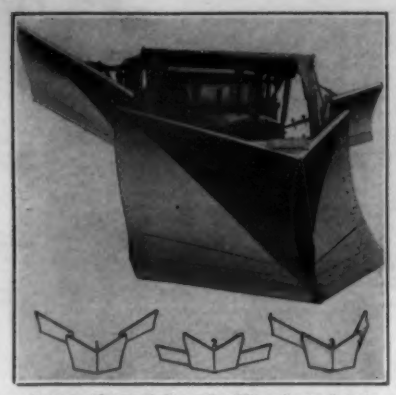
ALLIS-CHALMERS
TRACTOR DIVISION · MILWAUKEE · U. S. A.
2-CYCLE DIESEL POWER
3 Sizes—HD-7, HD-10, HD-14 60 to 132 Drawbar H. P.

TARPAULINS
ROAD MATS ★
WINDBREAKS

CONTRACTORS' SUPPLY DEALERS in every state sell the Fulton line. Specify SHURE-DRY and FULTEX Tents, Tarpaulins, and Windbreaks—anything made of canvas. Also Fulton Road Mats and Burlap. Fulton products are good and prices are right. If your dealer can't supply you write our nearest plant for catalog, samples and price list.

write for prices

Fulton Bag & Cotton Mills
Manufacturers Since 1870
ATLANTA ST. LOUIS DALLAS
MINNEAPOLIS NEW YORK NEW ORLEANS KANSAS CITY



A new line of V and side wing plows. Sketch 1 shows the wings in position for clearing drifts; 2, the wings used as extensions to the plow; 3, either or both wings fold back for passing an obstruction.

Hydraulic Operation For New Snow Plows

The new line of V and side wing snow plows, known as the 300 and 400 Series, just announced by the Baker Mfg. Co., 585 Stanford Ave., Springfield, Ill., is featured by the independent hydraulic side wing control. By means of two hydraulic cylinders for each wing, positive independent wing operation is provided. The front, rear or both ends of the wings can be raised or lowered or folded in tight against the tractor while idling or underway.

Made for use with all models of Allis-Chalmers tractors, these high V plows hug the front of the tractor and are hydraulically controlled by a four-way valve for raising, lowering, floating or forcing the blade down to cut ice or packed snow. It is stated that the flexible hydraulic operation of these plows, plus the independent side wing control, accomplishes faster, cleaner snow removal on high drifts and ice-encrusted packed snow and that average to heavy snowfalls can be handled easily at top tractor speeds.

Descriptive bulletins on these new Baker snow plows are now available and copies may be secured direct from the manufacturer or from this magazine.

New Catalog on Reflector Warning Signs and Markers

The Cataphote reflector button is a high grade optical lens scientifically designed to possess the property of reflecting light back in the direction from which it comes. The reflecting surface is so constructed that it becomes an integral part of the glass, allowing for no error in the travel of the light rays as they pass through and out of the lens. Thus the motorist sees the Cataphote as a brilliant spot of light resembling a small electric bulb, according to the manufacturer, the Western Cataphote Corp., Toledo, Ohio. Permanence of reflecting power, it is reported, is assured by applying the reflecting element directly to the rear surface of the lens, eliminating any air space between the glass and the reflector and avoiding the possibility of moisture condensation which quickly deadens reflection.

A new catalog recently issued by the Western Cataphote Corp. illustrates these reflector buttons and describes their use as warning signs for highways and in army camps, city entrance signs, lane and curb markers for highways and bridges, for mounting in guard rails as road delineators, etc. Copies of this catalog may be obtained direct from the manufacturer by mentioning this item.

Welding Equipment Described in Bulletins

The line of Marquette welding equipment, including several models of ac arc welders, electrodes for both ac and dc arc welding, arc torches, acetylene generators, electrode holders, helmets, cable and other accessories, is described and illustrated in a series of bulletins, copies of which may be secured direct from the Marquette Mfg. Co., Winter & Johnson Sts., Minneapolis, Minn., by mentioning this item.

Marquette welders are available in 20 to 275-ampere, 20 to 200-ampere, and 20 to 150-ampere models for operation on standard 220-volt 6-cycle current. Particularly suited for use in repair shops and highway garages, they are easily moved about the shop, or can be mounted on a truck for use in the field.

The New KEYLODE Contraction Joint

Highlights of this new joint:

1. A rigid, fully assembled unit for transverse contraction joints, ready to be spiked to subgrade. (No dowel bars required.)
2. The heavy plate shoes with arm braces insure uniform installation alignment of dowel plate.
3. The concrete slab edges are interlocked above and below the 12-gauge key-plate to transfer heavy traffic loads.
4. Economy in initial cost and lower installation cost mean a substantial saving over present dummy-joint methods.
5. The KEYLODE contraction joint, with 12-gauge plate dowel, also acts as a seal, and with the 20-gauge dividing plate held ¼" below top of slab, eliminates the necessity of edging and filling top of joint.
6. KEYLODE contraction joints are furnished crowned or straight, as may be specified, and are shipped painted and greased. (To break bond.)

Write
HIGHWAY STEEL PRODUCTS COMPANY
Chicago Heights, Ill.

AIRPORT
Runways
Aprons
Paving
MUST BE PROPERLY REINFORCED
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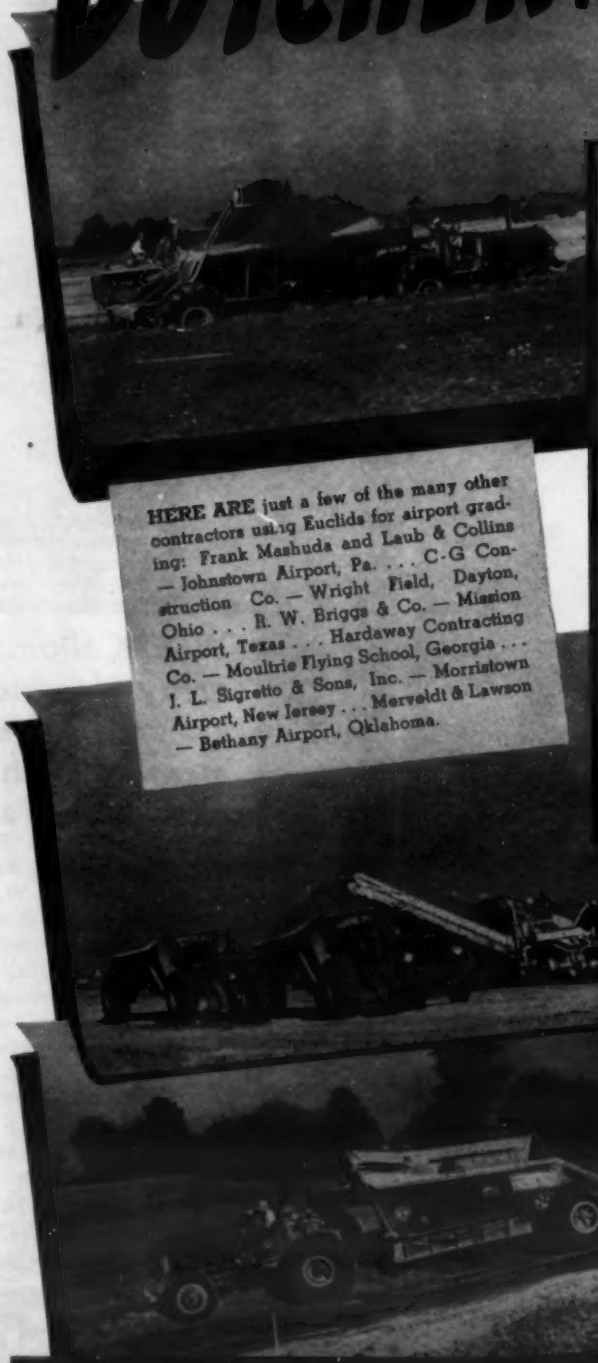
Design Data and Complete Steel Service

Write for this Bulletin and Direct Your Inquiries to

LACLEDE STEEL COMPANY
ST. LOUIS, MO.

DUTCHER makes the dirt FLY!



HERE ARE just a few of the many other contractors using Euclids for airport grading: Frank Mashuda and Laub & Collins — Johnstown Airport, Pa. . . . C-G Construction Co. — Wright Field, Dayton, Ohio . . . R. W. Briggs & Co. — Mission Airport, Texas . . . Hardaway Contracting Co. — Moultrie Flying School, Georgia . . . J. L. Sigretto & Sons, Inc. — Morristown Airport, New Jersey . . . Merveldt & Lawson — Bethany Airport, Oklahoma.

18,000 Cu. Yds. PER DAY

Yes, sir! Bottom-Dump EUCLIDS are making the dirt fly for Dutcher Construction Corp. at the New Castle County Airport near Wilmington, Delaware — 18,000 cu. yds. every 20-hour working day.

The entire 2,500,000 cu. yds. on this job is being moved with eight 13-yard and six 10-yard Bottom-Dump EUCLIDS and three 48" elevating graders. These fourteen Euclids are hauling approximately 1500 loads a day, 1800 feet each way.

There are good reasons why Euclids are at work on most defense projects. Be sure to check Euclid dependability and low hauling costs for your next job. We'll be glad to supply the facts and figures.

The EUCLID ROAD MACHINERY Co.
CLEVELAND, OHIO

EUCLID
SELF-POWERED
EARTH • ROCK • COAL • ORE
HAULING EQUIPMENT
And — CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS

Center Striping Unit Used by South Dakota

(*Continued from page 2*)

device in a smaller drum for the yellow paint. Each of these mixing drums has a spigot over the edge of the truck body for drawing off the paint into pails for transfer to the pressure tank.

The Applying Unit

Each of the pressure tanks has a screen set in the top to remove any material which might clog the small orifices in the spray nozzle used to deliver the paint to the road. A pressure of 45 pounds is maintained in the drum from which the white paint is applied and 25 pounds in the yellow drum.

The actual application is done from a small platform mounted on two rubber tires and firmly attached to the rear of the truck. On a 3 x 3-foot platform, the man controlling the application of the paint stands directly over the spray nozzles and spreader brushes. There are three of these attached to the platform, the center one for a 4-inch stripe of white and two side nozzles for yellow stripes of the same width. The 2-hole spray nozzles deliver the paint directly onto the road between a pair of shields which limit the width of the spray, and immediately back of this shield, as the truck moves forward, is an ordinary paint brush set to spread the material smoothly and work it into the surface of the road. The control of the paint is through three small levers, and it is possible for the man operating the striper to apply a single white line or a white line and a yellow line simultaneously on either side or both sides. In this way a great deal of time is saved as the truck does not have to go back over its work and the lines are always uniformly spaced from each other. South Dakota uses the standard method of a yellow stripe on the side of traffic as a warning against crossing the center line.

On this outfit, one man drives the truck and maintains the alignment by sighting from a black spot on his windshield through a loop wired to the radiator cap onto white spots on the road laid out by instrument. One man on the truck sees that the proper pressure is maintained in the pressure drum and that paint is always being mixed ready for transfer when the supply is low in either of the pressure drums. The traffic paint used in this work is Gleem, made by the Baltimore Paint & Color Works, Baltimore, Maryland. Inasmuch as the body settles in the vehicle, constant stirring is necessary to maintain a uniform thickness of paint for application.

The Rear Guard

This paint requires about 10 minutes to dry out against tracking in a hot dry sun, so a second truck with a large sign on the back warning traffic not to cross the newly painted center line between that truck and the striper stays about ¾ of a mile behind the striping machine. The striper itself has a large sign on the front similarly warning traffic to keep to the right and not cross the center line.

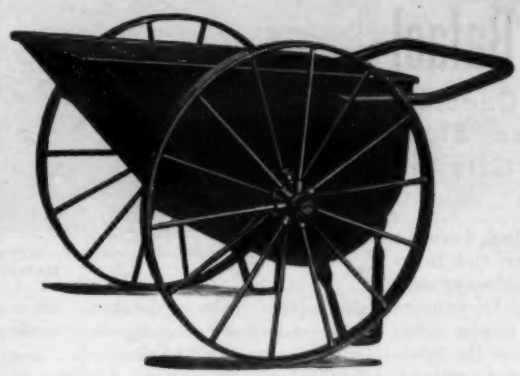
This outfit was designed by the Maintenance Division of the South Dakota State Highway Commission, and was made in the division shops.

Winter Heating Equipment

Littleford winter heating units to speed up cold weather construction is described and illustrated in a new bulletin just issued by Littleford Bros., 485 E. Pearl St., Cincinnati, Ohio. This line of equipment includes salamanders, concrete heaters, water heaters, and torches, all of which are designed to keep construction going during the cold weather.

Copies of this Bulletin P-11, which also contains a handy concrete temperature table, may be secured by those interested direct from the manufacturer or from this magazine.

STERLING No. 3 CONCRETE CARTS



STERLING No. 3 CART

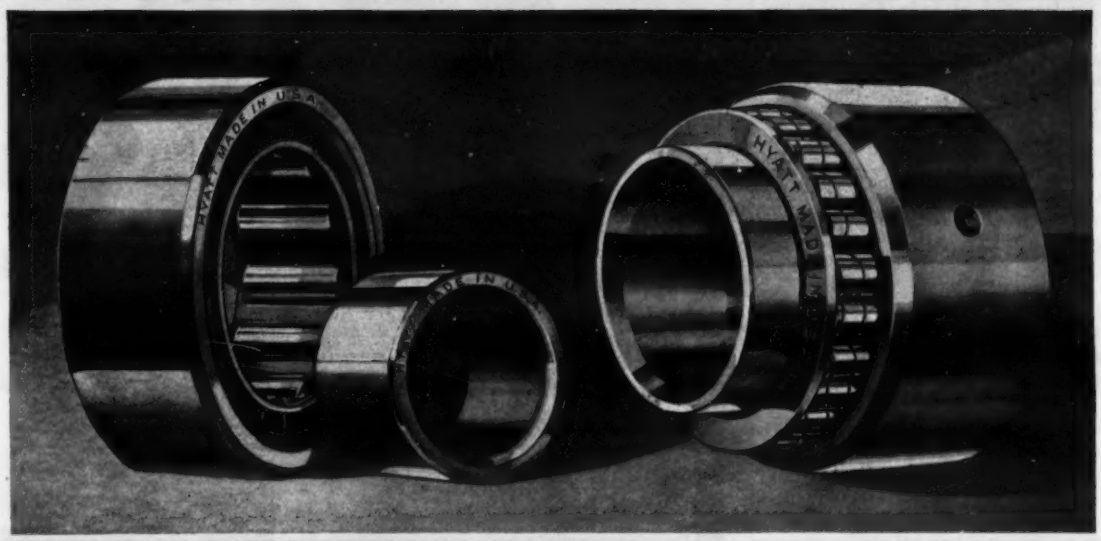
This cart can be furnished with pneumatic tires

30" or 36" dia. wheels, 6 cu. ft. capacity, 14 gauge tray, underslung heat-treated axle, plain or roller bearings.

A COMPLETE LINE OF STERLING WHEELBARROWS AND CONCRETE CARTS

STERLING WHEELBARROW CO., MILWAUKEE, WIS.

KEEP THEM GOING WITH HYATTS



NO MATTER WHAT THE APPLICATION

Precision built... great in capacity... Hyatts are helping to lighten the loads of all mechanized defense equipment.

Meanwhile, Hyatts still are serving in their regular, and now more essential than ever, role of keeping free from bearing wear and care the machinery which produces this defense equipment.

Therefore remember, today as always, that where the loads are heavy and the going is tough you can depend on Hyatt Roller Bearings for any application.

Hyatt Bearings Division, General Motors Sales Corporation, Harrison, N. J., Chicago, Detroit, Pittsburgh, and San Francisco.

HYATT ROLLER BEARINGS QUIET

USE RIGHT BUCKET FOR THE JOB

Hayward makes all four — clamshell, dragline, electric motor, orange peel. A Hayward recommendation is unprejudiced.

—HAYCO—

THE HAYWARD CO., 32-36 Dey St., New York

Hayward Buckets

Concrete Viaduct Over San Rafael

New 2,207-Foot Concrete Structure Carries State Highway Over City in California

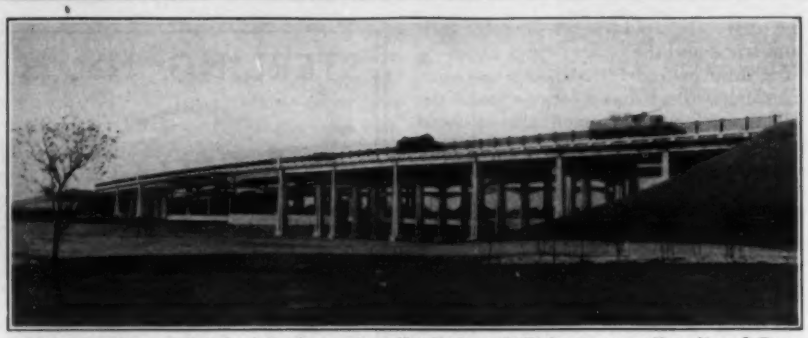
✦ THE citizens of San Rafael, Calif., a city on San Francisco Bay and intersected by the Redwood Highway, were somewhat startled when the Division of Highways announced that it was going to build a viaduct right over the town. And not a few shook their heads, estimating that it would take at least a million dollars to build it, and that was a lot of money for a bridge that wouldn't even cross a river.

However, when bids for the reinforced-concrete viaduct 2,207.5 feet long, rising on four-column bents an average of about 25 feet above ground level and carrying a four-lane divided highway were opened, the contract for the work was awarded to Heafey-Moore Co. and Frederickson & Watson Construction Co. on their low bid of only $380,999.10. Although everyone agreed the price was low, it wasn't one of those things where the contractor forgot to include the item for concrete or reinforcing steel. The bid resulted from plenty of figuring in advance on the methods used for maximum economy and on years of experience in this type of work. The contract was awarded on June 12, 1940, and work started on July 15.

Design

The design of the viaduct is interesting. It has 37 continuous girder spans and 30 spans of the flat-slab type, with continuous transitions between the two. They are of varied length to conform with conditions along the right-of-way, ranging from 17.08 to 57.5 feet long. The 8 spans at the north end and the 22 spans at the south end are of the slab design and the balance girder spans. The viaduct passes over five existing and one future city streets and over residential and industrial property.

The girders are curved concentrically with the center line, which has added to the appearance of the structure, simplified deck form construction, and provided a uniform cantilever distance from the outside girder to the deck. All spans are constructed on regular parabolic curves. Over half of the viaduct is on a 1,050-foot radius curve, and the maximum super-elevation is 4 feet. The four traffic lanes are each 12.5 feet wide, with a 4-foot raised strip between lanes.



The recently completed viaduct carrying the Redwood Highway over the city of San Rafael in California.

Excavation

The excavation involved was not large, amounting to about 16,300 cubic yards, but it promised to be troublesome, so the contractor subbed it to Paris Brothers of Berkeley, who specialize in that type of work. Paris went to work on the excavation for the bent footings with a ½-yard excavator powered by a Ford V-8 engine and a fleet of Ford trucks and in a few weeks the pile driving began.

Driving the Piles

The pile driving was subbed to M. B. McGowan, of San Francisco, who used a pile driver equipped with a Vulcan No. 1 hammer. Timber piling was driven to penetrations of from 45 to 60 feet to achieve 20-ton bearing. As the ground was unstable at the south or harbor end of the project, specifications called for driving approximately 935 linear feet of concrete piles in this area, a good percentage of which had to go in on a batter. The pile-driver leads were pivoted 55 feet up which enabled the accomplishment of this work with a relatively small pile driver. The concrete piling was driven to a 35-ton bearing.

Pile driving continued until April 21, 1941, handling thirty 30-foot timber piles in an 8-hour shift, and the job was completed without the driver being shut down once for a major repair. It has been equipped with its present rigging of preformed wire rope on the hammer lines for over three years without a failure. In this connection, Dick Verbrugge, Foreman for McGowan, said, "That ¾-inch preformed rope stands the

(*Concluded on page 30*)

THERE'S NO SUBSTITUTE

FOR ROSS plows with their scientifically designed "Sno-Flo" moldboards that pick up the snow and roll it. That is why they will go thru deep drifts and hard packed snow with less power. They are built to give more years of service at less cost for upkeep.

There is a large variety of models and sizes for trucks and tractors. See your nearest dealer or write for Catalog "L".

Engineered and Built by the

BURCH CORPORATION

Crestline, O.

Builders of Equipment for more than fifty years.

GET BIGGER OUTPUT— FINER SIZING WITH TELSMITH

Telsmith General Utility Portable Outfit, equipped with Telsmith-Wheeling Jaw Crusher and bucket elevator.

General Utility Crushing Plant

Ideal for the contractor or state or county highway department wanting a mounted crusher with a bucket elevator to deliver crushed product to bin or screen over bin. Furnished with either jaw or gyratory crusher, and with or without power unit. A low first cost, low upkeep outfit, exceptionally well built.

TELSMITH Standard PORTABLE Crushing—Screening—Loading Plants

A single crusher in closed circuit with a bucket elevator and vibrating screen. The crusher may be a jaw or gyratory (for coarse or medium sizing), or a secondary crusher for fine reduction. The jaw crusher furnished is a high-speed Telsmith-Wheeling with *cylindrical roller bearings*. It turns out a uniform cubical product unusually free from slabs or dust. Recommended for production of 1"–1½" rock. In all cases, crusher is in closed circuit with the screen. No oversize can get into product.

TELSMITH Coarse Crushing Portables—Mounted jaw or gyratory crusher, not in closed circuit. A rugged, big capacity outfit for quantity production on big road jobs.

TELSMITH Tandem Crushing Plants—A super-crushing portable for quarry use. A tandem combination—coarse crushing unit . . . followed by large capacity, fine crushing, screening-loading plant operating in closed circuit.

TELSMITH Dual Crushing-Screening Portable—Exceedingly mobile. Combines jaw breaker and roll crusher in closed circuit, with ample screening capacity.

P-3

FOR PRACTICAL IDEAS on production and profits with portables . . . whether you're crushing quarry rock or bank gravel . . . It will pay you to get FREE 20-Page GUIDE No. P-34.

The new Osgood Type 70 excavator.

Another Air-Control Excavator and Crane

Rated as a 1¼-yard shovel or a 15-ton crane, the new Osgood Type 70 excavator and material handler can perform the duties of a shovel, crane, dragline, clamshell, or pile driver. It is available with crawler mounting or with the pneumatic-tired wheel mounting of the Osgood Mobilcrane.

Among the features of this new excavator is the unit cast steel construction of the deck to give a stronger base for the machinery, lessen vibration and reduce the number of parts. The Type 70 is controlled throughout by air, except the hoist drum brakes, providing smooth and easy control of the primary motions, according to the manufacturer. The swing, travel and retract motions are all controlled by Twin Disc clutches. If desired, the unit may be supplied with independent travel mechanism and independent boom hoist, both of which are also operated by Twin Disc clutches. All controls are banked in front of and around the operator in the streamlined cab which provides ample protection and full vision, and is roomier to give greater access to the machinery. The upper body is centered on the revolving base by a gudgeon and pintle, revolving on conical rollers. Lifting strains on the vertical travel shaft are relieved by hook rollers.

Further details and specifications of the new Osgood Type 70 may be secured by those interested direct from the Osgood Co., Marion, Ohio, by mentioning this item.

Use of Calcium Chloride In Concrete Being Studied

C. R. Cornthwaite has recently been selected to conduct the research program on the use of calcium chloride in concrete at the National Bureau of Standards, as sponsored by the Calcium Chloride Association. Mr. Cornthwaite was formerly research chemist with the National Paint Association and more recently has been Assistant Engineer of Materials for the Engineering Department of the District of Columbia.

This research work at the Bureau of Standards extends the program of investigations conducted at the Bureau and reported by Paul Rapp in a paper "Effect of Calcium Chloride on Portland Cements and Concretes" in the 1934 *Proceedings* of the Highway Research Board. The present program, which has been underway since 1938, has developed valuable data on volume changes and strength development of concrete at low temperatures, and it is expected that reports of these studies will be presented in the near future.

Further investigations will study the effects of calcium chlorides as related to durability of concrete, low water cement ratios, etc. It is of interest that the soundness and strength tests being made in this investigation are being checked by the Sonic method, using the latest apparatus developed for this purpose.

Carey Elastite EXPANSION JOINT
Standard in Concrete Construction for 25 Years
ECONOMICAL and EFFICIENT
Asphalt Joint • Rubber Joint
Non-Extruding Expansion Joint
Plate-Dowel Expansion Joint
Sub-grade Felt
THE PHILIP CAREY COMPANY
Dependable Products Since 1873
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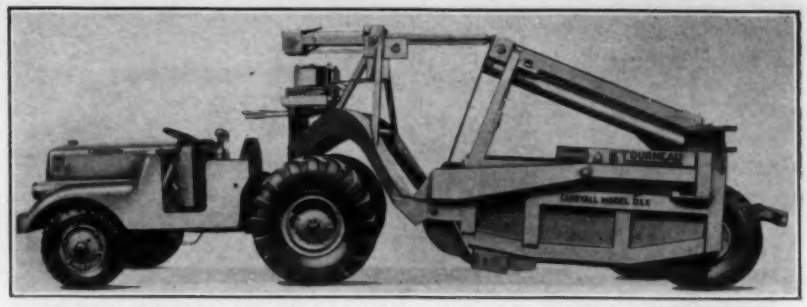

The new Model DLS Carryall for use with the new Caterpillar four-wheel tractor.

New Earth Scraper For Wheel Tractor

The new Model DLS Carryall scraper recently announced by R. G. LeTourneau, Inc., Peoria, Ill., and Stockton, Calif., is designed for use with the new Caterpillar four-wheel tractor. This unit is operated by cable from a standard LeTourneau power control unit which is also specially adapted for use with the new Caterpillar tractor.

With a rated capacity of 8½ cubic yards struck measure and 11 yards heaped, the Model DLS is very similar in construction to the Model LS used in the Tournapull outfit. It has the same steeper longer blade base, which causes material to boil in and flow back into the bowl and forward into the apron, and also has the same higher sides and built-up apron. The chief changes are in the yoke for mounting on the pulling tractor and the position of the power control unit. The cutting edge of the scraper is 8 feet 6 inches. With the apron cable dead-ended on the apron, all hoist and unloading cables are now placed up and out of the dirt, to eliminate cable wear by abrasion.

Further information on this new LeTourneau Carryall and power control unit may be secured by those interested direct from the manufacturer by mentioning this magazine.

". . . and Wire Rope
Service Records
also prove that
TRU-LAY Preformed
helps conserve
the nation's
steel supply. . . ."
"Yes sir—practically every user who keeps the same sort of performance records on his wire rope that he does on his motor trucks, man hours, etc.—is sold on TRU-LAY Preformed. He knows, from his own records, that TRU-LAY far outlasts ordinary non-preformed. He knows that it repays its slight premium cost over and over again in easier, safer handling, faster reeving; better spooling—*longer service*." • American Cable engineers encourage the keeping of rope performance records. . . . For two reasons: first, they tell the user exactly what rope construction is best suited for his job; second, for the selfish reason that performance records make repeat orders for TRU-LAY Preformed automatic. . . . Write today for a supply of WIRE ROPE SERVICE RECORD FORMS. They are free. Their use will help increase production and lower costs. They are free of cost and obligation—and may be used with any type or make of wire rope. Prove to yourself that American Cable TRU-LAY Preformed is even *better* than we say it is.
In Business for Your Safety
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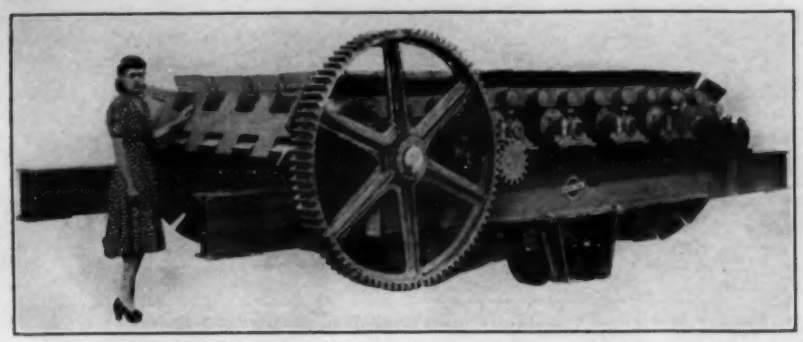
ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*



The new giant Telsmith feeder recently shipped for service at the Panama Canal.

Heavy-Duty Feeder For Canal Service

A special giant feeder for use in a large crushing job in connection with the construction of the third set of locks at the Panama Canal was recently shipped to the Canal Zone by the Smith Engineering Works, 4014 North Holton St., Milwaukee, Wis.

The weight of this feeder is 39,000 pounds and the girl in the illustration gives some idea of the enormous size of the machine. The unit is 6 feet wide x 12 feet long, and feeds the rock as it comes from the quarry to a 66 x 84-inch jaw crusher. The feeder will handle several thousand tons of rock per day, which is reduced to a size suitable for concrete aggregate. Its purpose is to give a steady flow of quarried rock to the jaw crusher, and to enable operators to start and stop the flow of material to the plant at any time.

Compressed Air Institute Announces Prize Contest

Announcement has been made by the Compressed Air Institute of a nation-wide contest for the best articles on any subject of particular interest to the compressed air industry. The contest started December 1, 1941, and will continue for six months, closing June 1, 1942. Fourteen cash prizes will be given, including a first prize of $100, three $50 prizes, and ten $25 awards.

Virtually no restrictions are placed on the eligibility of contestants, nor is the subject matter of their presentations limited, other than that it be concerned with some use or phase of compressed air. The contest is open to any employee of any organization using or associated with compressed air in any department, except the executives of companies comprising the Institute.

Articles submitted are to be judged according to the usefulness to the industry of the idea submitted; the originality of the text; the value of the text to the greatest number of industries, and the technical accuracy and completeness with which the subject is treated. Any entry which is particularly adaptable to defense work and the speeding up of the defense program, whether a prize winner or not, will be brought to the attention of the proper government agency, with full credit to the contestant.

This contest is being sponsored by the Institute's Educational Committee, and further information may be secured from Russell Gross, Educational Director, Compressed Air Institute, 45 Warrington Place, East Orange, N. J. Entries in the contest, however, should be addressed to C. R. Rohrbach, Secretary, Compressed Air Institute, 90 West St., New York City.

Le Roi Co. Completes 25 Years in Business

In October of this year Le Roi Co., manufacturer of engines, compressors and engine-generator sets, celebrated its twenty-fifth anniversary. The present company, which began its existence in a small shop on the site of the present main building, now consists of three plants, all located in Milwaukee.

Highlights in the history of the company include the introduction by Le Roi of the first multiple-cylinder industrial unit used on construction machinery; the development of a series of oil pumping and drilling engines; and during the past year the award to Le Roi by the U. S. Army of the largest portable air compressor order ever placed with one company.

C. W. Pendock has been President and J. R. Frantz Vice President of the company since its inception.

SPECIFY . . . . . .

HY-ROCKET Fan-Belt Driven Hydraulic Power Controls
(For Snow Plows, Road Maintainers, etc.)
MONARCH Underbody Truck Scrapers
MORCO Culvert Cleaners
HI-PRESSURE Hydraulic Hose

Monarch
ROAD MACHINERY COMPANY
328 FRONT AVE., N.W.
GRAND RAPIDS • MICHIGAN

OSGOOD

TYPE 20

the biggest value in the ½ cu. yd. class. Available as shovel, crane, dragline, etc., on crawler, truck or pneumatic-tired wheelmount.

Write for Catalog and Specifications.

THE OSGOOD CO.
MARION OHIO

The simple procedure illustrated above accounts for the untiring accuracy of the Barber-Greene. The desired quantity of each size aggregate is weighed, and the feeder gates locked at this setting. The bitumen metering pump is set for the desired ratio, and mechanically interlocked with the aggregate feeder. The Barber-Greene achieves POSITIVE PROPORTIONING in bituminous mixing. Feeding these accurately proportioned materials into the twin pugmill in a proportioned continuous stream, the Barber-Greene easily delivers a uniform mix, ton after ton—mile after mile. The Barber-Greene has set entirely new standards for short inexpensive moving and set-up time. Investigate this ingenious machine. Complete literature on request. Barber-Greene Company, Aurora, Illinois.

BARBER GREENE

"Keep 'Em Moving" Slogan in Oregon

Open and Safe Roads in Winter Is Oregon's Aim; Good Organization and Equipment Get Results

By R. H. BALDOCK, Chief Engineer, Oregon State Highway Commission

(*Photos on pages* 1 *and* 40)

✦ ALL phases of highway work lead to the final objective of providing transportation service. While it is very important to have a road correctly designed and substantially constructed, it is even more important to have the road maintained satisfactorily and operated in such a manner as to alleviate hazard and expedite the flow of traffic. To this end, the Oregon State Highway Commission endeavors to maintain its roadways and appurtenances in such manner as to cause the least possible hazard, delay and inconvenience to traffic.

When slides occur, extra gangs move them quickly. Signs and signals are installed to warn and inform the public. Pavements are patched during the summer months by skilled crews using hot asphaltic concrete to repair not only the breaks in the pavement, but fill in all depressions, as rough pavements are dangerous. Sanding crews work day and night to provide suitable friction on icy surfaces, and snow is removed as rapidly as it falls. The slogan of the Maintenance Division is to keep traffic moving safely and swiftly.

Snow Drift Control

The Oregon State Highway Commission has had long experience in the removal of snow from the highways. The main routes of travel traverse many high passes through the Cascade Mountains in the central portion of the state and the Blue Mountains of eastern Oregon.

Wind-swept stretches are protected by miles of snow fence. Long experience has indicated where these snow fences are required, and many times three or four lines of snow fence are built where severe weather conditions are encountered. The use of snow fence and the raising of road-bed grades have practically eliminated the formation of snowdrifts on the highway surfaces, except in unusually severe storms.

Snow slides are very infrequent in Oregon; in fact, there is only one short section through the Cascade Mountains where slides have been known to occur. To stop a slide, a series of woven-wire fences parallel to the highway were installed to retard the movement of the snow. This installation has proved very satisfactory and no slides have occurred since the fences were constructed.

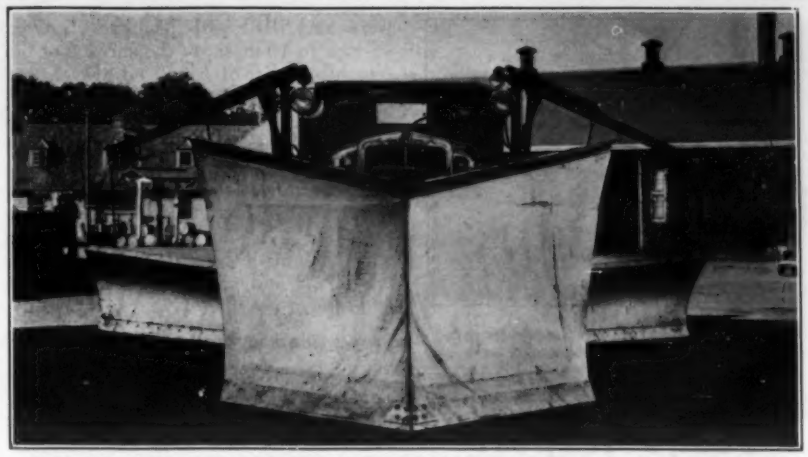
The Men and Machines

It is necessary to employ a large force of men and to have on hand equipment in sufficient quantity and suitable quality to perform snow-removal work effectively. To supervise maintenance operations, the state is divided into five divisions, each division is further divided into several maintenance districts, and the maintenance districts are in turn divided into maintenance sections. There are 15 maintenance districts and 130 maintenance sections, employing from 1,000 to 2,000 men in maintenance work.

Oregon's snow-removal equipment includes 17 auger-type rotaries, 255 blade push plows, 5 large V-type snow plows, and several others of miscellaneous types, with the requisite trucks and tractors to furnish the motive power for the plows. Equipment repair shops are located at Salem, La Grande, Klamath Falls and Coquille.

Radio Plays Part

A complete radio-telephone network of twenty-three stations operating on a frequency of 1,706 kc, with a radio technician in charge, provides state-wide coverage. Complete information on road conditions is obtained by radio each morning and a 9 o'clock broadcast is made from the central station at Salem. Likewise each morning a typewritten road report is made up and distributed from the Salem headquarters to the various newspapers and to the Oregon State Motor Association.



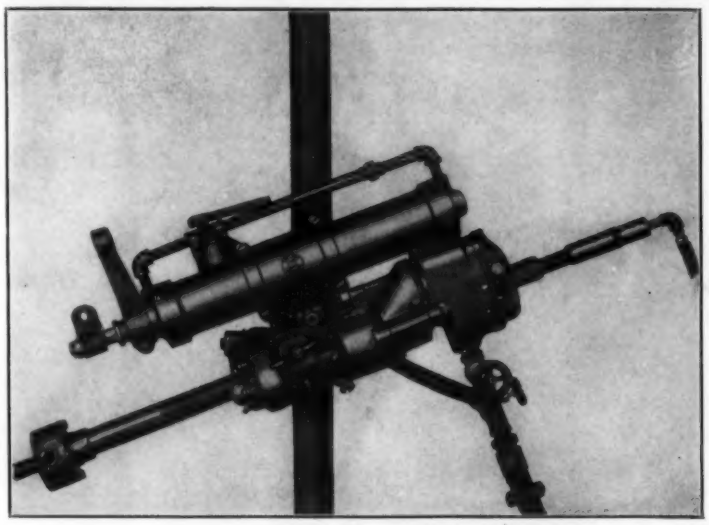
One of the Oregon State Highway Commission's large V-type and wing snow plows.

In addition to the permanent radio set-ups, portable mobile radio transmitters are used for the purpose of obtaining definite information on road conditions and for the expediting of the delivery of equipment parts.

(*Concluded on page* 33)

★ ★ ★ ★ CHICAGO PNEUMATIC NEWS ★ ★ ★ ★

NEW LIGHT-WEIGHT DIAMOND CORE DRILL



COMBINES HIGH DRILLING SPEED WITH EASE OF MOUNTING

No Costly Station Cutting

NEW YORK—New from the ground up, CP No. 5 Diamond Core Drill is faster and lighter than any other diamond core drill of the same capacity. Weight and air consumption are about the same as those of a 3½" drifter with the same 24-inch change. Ideal for short hole prospecting, underground, wall sampling, etc. Particularly adapted to long hole drilling in drawing pillars; equally good for "blast hole" drilling in drifts and stopes where conditions are favorable to that type of drilling.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 6 East 44th Street, New York, N. Y.

↑ ONLY 42-1/2 INCHES OVERALL, weighing only 250 pounds with rod puller, CP No. 5 Diamond Core Drill has a capacity of 500 feet with Standard E Rods and EX Fittings.

MOUNTS LIKE A DRIFTER ← on any rock saddle and works in any position from a column, arm or crossbar. Can be operated wherever a drifter set-up can be made.

BIT SPEEDS UP TO 1500 R.P.M., with stepless → throttle regulation. Balanced design, smooth rotary power, minimum rod vibration mean greater footage per shift, lower drilling costs per foot.

↑ WORTHY TEAM MATE of this CP-60 MOTORdrifter, CP No. 5 Diamond Core Drill, with its high speed and maximum core recovery, makes underground diamond drilling easier, faster and cheaper.

CHICAGO PNEUMATIC

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SINKER DRILLS
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DIAMOND CORE DRILLS

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write for Job Estimate and Literature
COMPLETE
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38-40 11th St., Long Island City, N.Y.
Tel. IRonsides 6-8600

C. & E. M. Photo.
All trucks working on the Fargo airport bore these distinctive plates.

Fargo Airport

(*Continued from page* 1)

gineer Department, consists of the construction of a new N-S runway, off the center line of the old field, 5,000 feet long, 150 feet wide, of soil-cement construction, and a total width of 300 feet with the drainage trenches 102 feet on either side of the center line of the runway.

In addition the NW-SE runway is being extended 1,600 feet and the older section of the runway being raised from 12 to 18 inches and surfaced like the new N-S runway with 6 inches of soil-cement base and a surface of 1 inch of a hot bituminous mix. The program also calls for increasing the area of the concrete warming apron.

Drainage

When the present contract construction and the WPA program carried on by the city is completed, the airport will have an estimated total of 150,000 feet of drainage, including runway drainage, intermediate drainage and some of the original farm drainage in the area. The main drainage for the airport was furnished by a county ditch which parallels the new N-S runway and then toward the northern end of the airport swings east across the runway. This has been replaced by a 60-inch reinforced-concrete pipe backfilled to the elevation of the field. Other drainage includes a boundary ditch along the north limit of the original field in which 18-inch corrugated-metal pipe and 15-inch vitrified-clay pipe has been installed by WPA and the ditches then completely backfilled.

The field drainage was generally not quite adequate and has been supplemented in a number of points by new drains installed by WPA, which has also installed the drainage in the acquired 40-acre tracts to the north of the original field. All drains flow to the 60-inch reinforced-concrete line, with the exception of the drainage from the concrete apron, which goes to the city sewers.

The runway drains, 102 feet either side of the center line of the runways, were excavated from 17 to 30 inches wide and from 2½ to 6 feet deep with a Barber-Greene trench excavator. Corrugated perforated metal pipe of Toncan and U.S. Steel brands, varying from 8-inch to 21-inch, was used in the runway drains. Manholes were installed where the old drainage system crossed the new line and at the intersections of future runways as well as at the location of certain side drains. The drains were backfilled with pea gravel, from ¾-inch to 10-mesh, to the surface of the 6-inch base lift of stabilized gravel, and then above that through the B Lift of 6 inches the material is a bituminous-bound 1½ to 2-inch stone mixed in a standard concrete mixer and placed to form a stable porous drain surface flush with the runway. This replaces loose gravel or stone on top of these ditches which might be blown by propellers in taking off and cause damage to wings and tails of the planes.

Preparation for Runway Construction

The initial preparation for the construction of the N-S runway included the stripping of the southern 2,600 feet where it was located in the old well-compacted ground of the original airport and then compacting 2,400 feet of the well-tilled farm land in the two 40-acre lots north of the original airport. The stripping was done with an Austin-Western 99 power grader with hydraulic controls, using either the blade or the scarifier to loosen the sod which was then loaded by a spiral feeder onto a conveyor pulled behind the power grader and delivering the stripped sod to trucks backing under the loader. All soft ground was compacted with sheepsfoot rollers under optimum moisture conditions.

Foundations and Shoulders

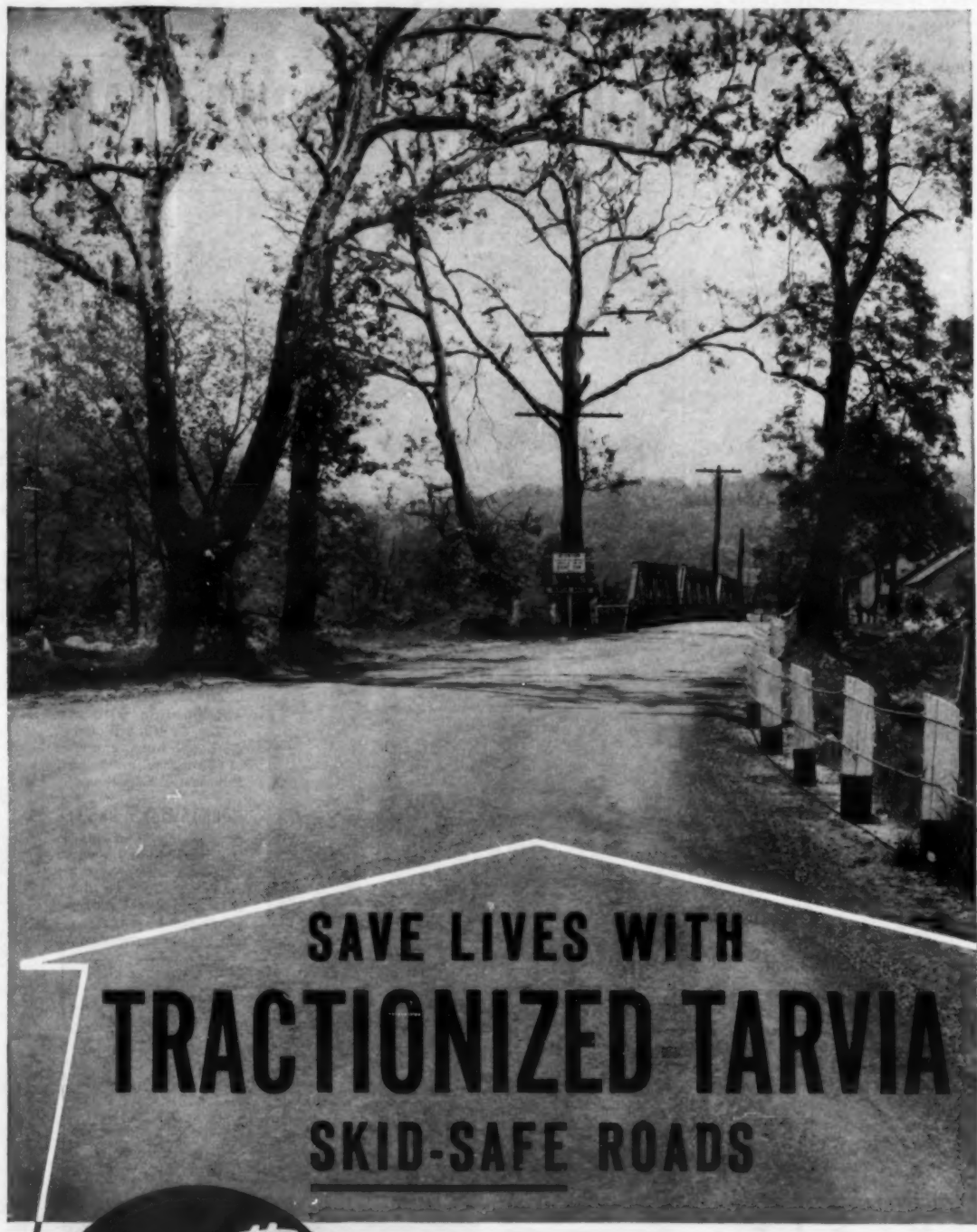
To provide for lateral drainage and snow clearance, the foundation for the runways was raised above the level of the surface of the field, with a 1.5 per cent slope from the center line to the edge of the runway.

This foundation, known as Lift A, is a 6-inch stabilized sand-clay material mixed on the runway by a Jaeger traveling mixer, and then compacted with sheepsfoot and rubber-tired rollers. Lift B, also 6 inches thick, is the shoulder for the 6-inch soil-cement runway and is of a higher order of sand-gravel-clay stabilized mix containing a higher per cent of coarser material than Lift A.

All of the material for these two lifts, as well as for the soil-cement operation, was hauled in a distance of 13 to 14 miles for the sand and gravel and about 2 miles for the clay. The sand for Lift A came from the Fitzgerald pit, while the Benedict pit furnished fine gravel and the binder fraction, a granular binder, and the Connelly pit directly across the street from the Benedict pit furnished the coarser aggregate of 1¼-inch maximum size which was excavated under water and added to the material from the Benedict pit. All of these pits are within a circle ¾ mile in diameter at Sabin, Minn. The Fitzgerald pit is somewhat variable so had to be bulldozed to get the proper combination of sizes to meet the sieve specifications. The clay was hauled 2 miles from the South Fargo city limits. Lift A consists of clay and material from the Fitzgerald pit while Lift B is material from the Benedict and Connelly pits with clay added and the soil-cement material is a combination of material from the Benedict and Connelly pits.

The material for Lift A was loaded

(*Continued on next page*)


SAVE LIVES WITH
TRACTIONIZED TARVIA
SKID-SAFE ROADS
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GOOD ROADS AT LOW COST
These smooth-riding, long-lasting roads provide skid-safe motoring . . at any sane speed . . . in both wet and dry weather.
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RENT or SELL
Cone, loosely mounted on rods not threaded, is recommended on some jobs.
Wide brackets eliminate use of washers and plates.
Inside rods have 1⅛" of threaded end to bond patch which will stand a hammer test.
Write for circular
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GRAND RAPIDS MICH.

Fargo Airport

(*Continued from preceding page*)

with a Koehring shovel turning out a truckload every 50 seconds and with always one or two trucks waiting for their loads. The truck fleet varied as the work changed from 60 to 80 trucks working 24 hours a day and delivering a truckload a minute to the airport where it was dumped in a windrow and shaped up by an Adams motor grader.

The Soils Laboratory

In the same building with the Field Office of the U.S. Engineer Department Resident Engineer at the Airport, a rather complete Soils Laboratory was maintained. Detailed tests were made of all pits at the start of operations. Following that only routine tests were made or when changes were made from one lift, that is from Lift A to Lift B, to insure the proper selection of the area in the pit to give the specified mixture. A series of tests were made daily as necessary to insure proper control of the material as placed on the runway. In general the different pits were used to give the different gradations of material as mentioned in the paragraphs above. At the beginning of the soil-cement operation, very careful tests were made for moisture control until a series of practical field observations gave rule-of-thumb or visual determinations which reduced the volume of tests to only those routine tests necessary to insure proper control.

The Basic Plan

Considerable thought was given to establishing a basic plan of operation on the soil-cement work as the original contract for runways represented nearly 40,000 feet of 25-foot roadway to be built. Having first selected the method of mixing, a Jaeger traveling mixer, the contractor laid out the operation first in 600-foot lengths for one mixer, and then in 1,200-foot lengths. The soil-cement was laid in 25-foot alternate lanes because this gave access for the trucks hauling cement and the tank trucks providing water for the mixing operation. Two windrows of the sand, gravel and clay were laid down for each 25-foot lane between parallel 6 x 6-inch rough sawed timber spiked through with heavy form spikes. It was planned at first to use a 600-foot section with the traveling mixer going up one side, mixing the windrow, and down the other side, and therefore completing one 600-foot section in two hours. It then became apparent that it would be better to lay out the parallel forms for 1,200 feet with two windrows between them and then to break the forms at the center of one side where the paver would enter, turn left and mix 600 feet the first hour, start down the opposite side and complete that in two hours, and then return to the point of entry in the fourth hour of operation.

Handling the Cement

The bulk cement used on this contract was delivered in box cars on a siding about ¼ mile from the main entrance to the airport. Here the contractor built two loading platforms so that two trucks could be loaded with the cement at once and each batch of cement carefully weighed. Five men worked in each box car, shoveling the bulk cement into galvanized iron baskets, carrying them out, weighing them on a wheelbarrow scales, and then packing them on the flat-bed trucks used for hauling 80, 90 or 120 baskets of cement per load to the mixer. The average weight per basket of cement, including the weight of the basket, was 109 pounds. After one tier of baskets had been loaded on the truck they were covered with planks, roped together, and the next tier placed on top and similarly roped and planked.

On the windrows another crew of five

(*Continued on page 26*)

C. & E. M. Photo

The Jaeger mixer with one of the three tank trucks which supplied water for the mixing operation at the Fargo airport.

CRACKING ROCK for ROADBEDS

INTERNATIONAL POWER Fills the Bill!

WHEN AN INTERNATIONAL TD-18 Diesel TracTracTor bores into a mountain side and meets up with hard, weathered Nevada granite, the tractor *comes through,* ready for more! There's no doubt about it—the rocks (at left, above) are taking a beating. These rocks, destined for roadbed fill, are all in the day's work for Tony Marazzo's TD-18 and bullgrader combination, working out of Boise, Idaho. This is the kind of power that contractors all over the country are using to lick the toughest going.

The UD-18 Power Unit at the right, above, is another International product having a set-to with solid rock. The UD-18 is furnishing steady, dependable power at low cost for a rock crusher on the Skyline Drive development in Virginia. The outfit is owned by Lambert Bros., Knoxville, Tenn.

Fuel economy, the right power for the job, and a variety of tractor and engine sizes make the International Industrial Power line *a sure winner for your work.* Ask the nearest International Industrial Power dealer or Company branch about the full line of TracTracTors, Wheel Tractors, and Power Units.

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Portable Combination Hot and Cold Mix Plants
Portable Hot Mix Plants
Stationary Combination Hot and Cold Mix Plants
Cummer Combination Dryer-Coolers.
Steam Jacketed Mixers 400 to 8000 pounds capacity.
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THE F.D. CUMMER & SON CO.
Euclid and 17th, Cleveland, Ohio

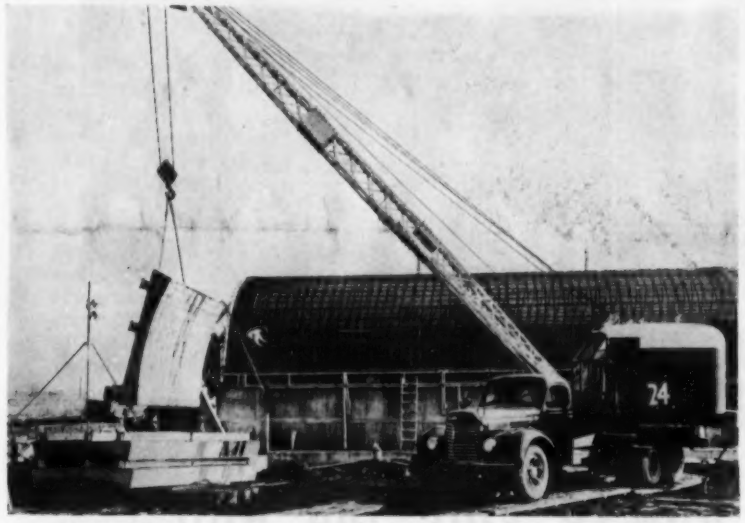
C. & E. M. Photo

SIGNS play an important part in the relations between the public and state highway departments. Here is one used by the Michigan State Highway Department, giving full information on the project under construction, its exact location and its purpose. Highway departments could aid considerably in the "Build by Contract" campaign by including in such signs the name of the contractor doing the job and the fact that the contract was awarded to the lowest responsible bidder.

TIMBER. This 140-foot-span pedestrian bridge of pressure-treated structural Douglas fir with Teco timber connectors was assembled on the roadway and then moved into place across the San Lorenzo River at Santa Cruz, Calif.

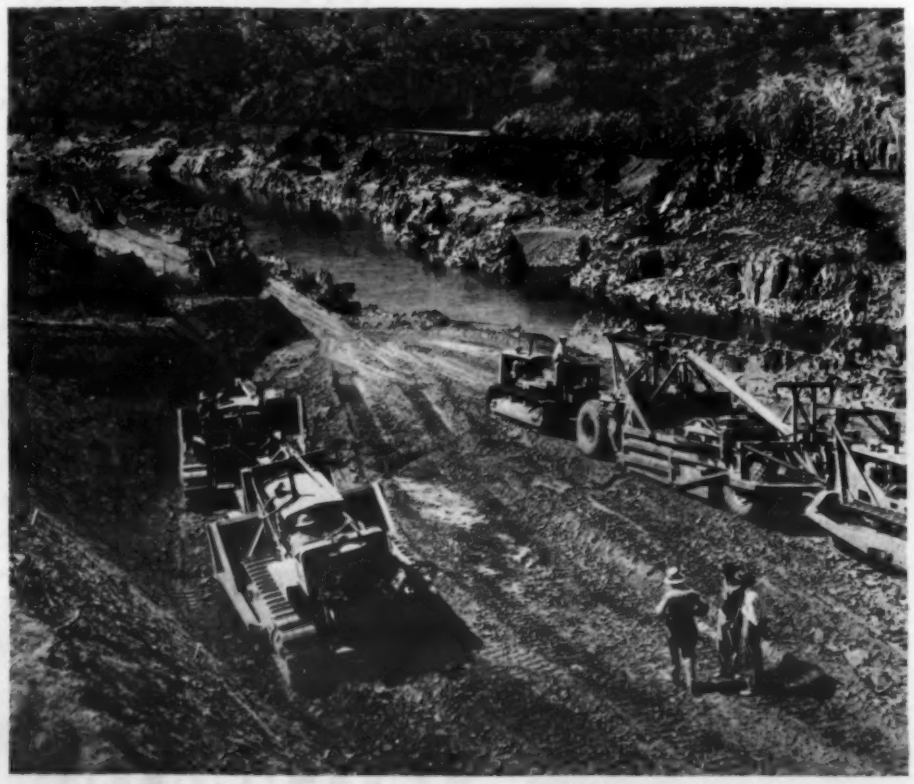
COUNTY RO
by Allegany County,

FLOOD. Action of water entering and leaving a double 10 x 4-foot culvert during the spring flood of 1941 in Stearns County, Minnesota.



DEFENSE. In the construction of a U. S. Army ordnance plant, Bates & Rogers Construction Co. of Chicago used a Byers crane mounted on an International six-wheel truck for placing and removing concrete forms.

LIFT. This recently completed vertical-lift bridge across the Naches River in Texas makes it possible for ocean-going vessels carrying defense materials to navigate the river. Operation of the 245-foot span is by means of a Westinghouse 75-hp motor and control equipment.



ANOTHER DAM. Dirt-moving equipment tearing up earth as the Atkinson Kier Co. gets ready to place concrete in the base of Keswick Dam in California. This structure, 9 miles below Shasta Dam, being built by the Bureau of Reclamation, will provide an afterbay reservoir for Shasta, fish-trapping facilities, and power.

...Wellsville and Andover, N. Y., being widened to 24 feet, including ... The International tractor and Bucyrus-Erie bulldozer outfits, owned ... curve. Harvey Craig is Superintendent of Highways for Allegany County.

CHECKING incoming truckloads of cement, sand and gravel for use on the Samuel B. Rosoff contract on the Delaware Aqueduct in New York state. The Toledo motor truck scale has a dial indicating capacity of 20,000 pounds, with 20-pound calibrations, and the platform is 28 x 10 feet, built of concrete.

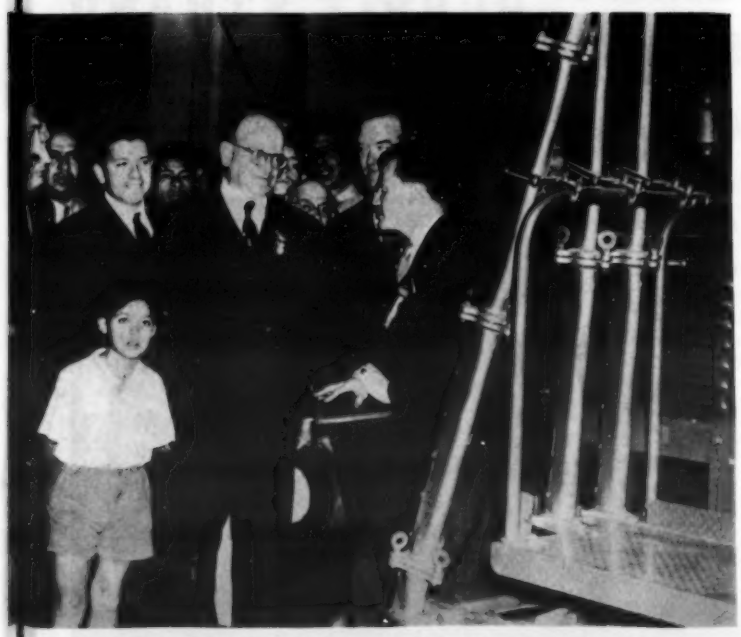
TRENCHES for building foundations at the Ravenna shell loading plant, Ohio, are dug by a Barber-Greene ditcher to save time and labor.

...s of a fleet of Cummins-diesel-...wered Euclid dump trucks carry-...12-yard load from a Northwest ...the grading of the U. S. Army ... Depot at Charlotte, N. C. Over ...rds of earth was moved by Wm. ...nstruction Co., Inc., of Durham, N. C., on this project.

Bureau of Reclamation Photo

WELDERS GANG UP. Seven arc welding operators at work on a penstock section for the new Parker Dam power project being built by the Bureau of Reclamation at Parker Dam, Calif. The huge penstock was entirely field fabricated by the Chicago Bridge & Iron Co., using the Lincoln Electronic Tornado process.

CLEAN-UP. At right, blade plows owned by the Massachusetts Department of Public Works move in echelon to clear remnants of snow from the Newburyport Turnpike. Below, a battery of plows, consisting of a blade and wing, a rotary and a V-type unit, widen a state highway in Michigan.



...AMERICAN. Indicative of the tremendous interest evinced in United States-made road-building equipment by Latin American ...gineers and officials at the Fourth Pan American Highway Congress in ...ty is this scene at the booth featuring Etnyre bituminous distributors.

Insignia Distinguishes Trucks in Defense Work

To match the olive drab that distinguishes the thousands of motor trucks serving the streamlined divisions of the U. S. Army, a distinguishing insignia has now been made available for the other thousands of trucks which are serving the nation by hauling the ever-increasing volume of defense materials, or playing their important part in defense construction.

In the form of a shield in a bright patriotic red, white and blue color combination, this new placard being furnished by Dodge dealers throughout the country for use on trucks in defense work, proclaims in large letters "This Truck Hauls Defense Materials".

The chief purpose of these placards is to impress upon the public generally the important role played by motor trucks in defense preparation. Contractors may well add to this by using such placards on the trucks on their defense construction contracts to let the public know as well the part the construction industry is playing in the defense effort.

Bridge Railings Booklet

A new booklet "Bridge Railings: Their Design and Construction" has just been issued by the American Institute of Steel Construction. By means of text and drawings, a variety of steel bridge railing designs are studied and discussed, all of which meet the requirements of safety and attractive appearance.

Copies of this booklet may be secured by interested contractors and engineers direct from the American Institute of Steel Construction, 101 Park Ave., New York City, by mentioning this magazine.

Channel Excavation Along Bois de Sioux

(*Continued from page 2*)

of Sundays and legal holidays, and was completed October 30, 1941. The contractor used three Bucyrus-Erie draglines, a 54B, a 43B and 37B. The 54B worked continuously while the 43B operated for 14 months up to July 14, 1941 and the 37B worked for 6 months in the winter of 1940-41, except for three weeks when it was shut down because of frost with which it could not cope. During this time the largest machine, the 54B, worked continuously. The smallest machine did not require mats but the 43B and the 54B used them on very soft ground at the south end of the work toward the close of operations. Each machine worked three shifts daily with two men, an operator and an oiler, on each shift.

The largest of the three machines, the Bucyrus-Erie 54B which worked throughout the job, had a 75-foot boom and handled a 4-yard Page dragline bucket and was powered with a 217-hp diesel engine. Throughout the work the channel was dug one half from each side so that the spoil banks were uniform. The 54B moved about 4,500 cubic yards of material on its three 7½-hour shifts.

The total yardage in this contract for channel excavation amounted to approximately 3,600,000 cubic yards which was moved at a unit price of 5.375 cents per cubic yard. The total completed cost of the contract, including all change orders, was $211,700.97.

Personnel

The work was done under the jurisdiction of the U. S. Engineer Department, St. Paul, Minn., Office, Major J. W. Moreland, District Engineer, with O. B. Emswiler as Resident Engineer and C. W. Heber as Inspector on channel excavation. B. L. Trawicky was Office Engineer. August Wegner was Superintendent for Megarry Bros. of St. Cloud, Minn., contractor for the channel excavation.

Portable Service Stations

How power lubrication of equipment on the job safeguards machines, cuts lubrication time, reduces maintenance costs, and speeds up the completion of contracts is described in the new catalog on Alemite portable service stations recently issued by the Alemite Division, Stewart-Warner Corp., 1850 Diversey Parkway, Chicago, Ill. These portable service stations are very flexible, the specific equipment being determined by the purchaser's requirements, but in all of them Alemite air-operated barrel pumps deliver the lubricant direct from the original drums, to save handling costs and insure clean lubricants, free from contamination.

A copy of this new catalog on Alemite portable service stations may be secured by those interested direct from the manufacturer by referring to this item.

MARVEL

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GAS OR ELECTRIC

For Full Particulars

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Marvel Equipment

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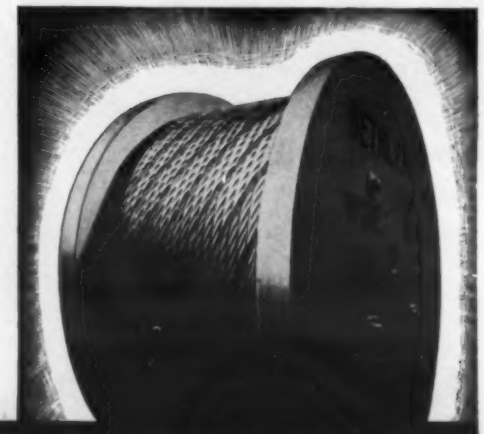
supple as a whippet

Two unusual qualities are combined in Purple Strand Form-Set wire rope: rugged toughness and pliant ease.

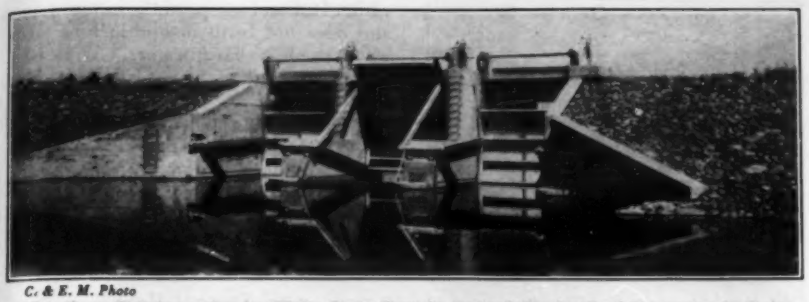
Purple Strand is made of the toughest steel used in wire rope—Improved Plow. Then this tough rope is preformed (every strand permanently shaped into its helical position as the rope is being made). As a result, Purple Strand Form-Set is relaxed, easy to handle. Broken wires won't wicker. No seizing is necessary when the rope is cut or spliced. Fatigue-resistance is improved. Purple Strand Form-Set is our top-notch rope. Try it.

PURPLE STRAND
FORM-SET
WIRE ROPE



BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY



C. & E. M. Photo
The three Taintor gates in White Rock Dam to control the level of the water in Lake Traverse, Minnesota.

Earth Dam Conserves Lake Traverse Water

(*Continued from page 2*)

stream and 1 on 2 downstream. The maximum height of the dike is approximately 16 feet. All of the fill was put in with carry scrapers, with the borrow taken from both sides and the east end of the embankment. The upstream, or south, side is protected by a 12-inch thick layer of field stone riprap on a 6-inch laid gravel blanket.

The quantities involved in the construction of White Rock Dam included 329,244 cubic yards of earth embankment, 1,245 cubic yards of concrete in the concrete control structure, 18,586 cubic yards of riprap, 8,778 cubic yards of gravel protection under the riprap, and 7,289 cubic yards of sand and 4,580 cubic yards of gravel in the sand and gravel toe drain.

The Toe Drain

The design of the toe drain is such that its width is 1½ times the dike's elevation in feet and with a minimum width of 8 feet. Located on the downstream side it is comprised of 6 inches of sand overlaid with 6 inches of gravel and then another 6-inch layer of sand. The exposed face of the toe drain is covered with riprap.

The Channels

The approach channel to the control structure from the south side is 6,000 feet long south from the dike and then turns west for 2,300 feet. It is on a flat grade and acts merely as a guide for the water. It was excavated 20 feet wide on the bottom and with 1 on 2 side slopes. The discharge channel, which is 60 feet wide on the bottom and with 1 on 3 slopes, is heavily riprapped 12 inches thick and connects with the Bois de Sioux channel which was excavated by Megarry Bros. of St. Cloud, Minn., and is described in the accompanying article.

The Control Structure

The control structure consists of a concrete weir and side wall with three Taintor gates 13 feet wide for the control of flood waters. The gates are hand operated. The concrete structure supporting the Taintor gates was built of reinforced concrete.

Personnel

The White Rock Dam, which is a part of the Lake Traverse-Bois de Sioux project for flood control and conservation, was built under the direction of the United States Engineer Department, St. Paul, Minn., District Office, Major J. W. Moreland, District Engineer, with J. O. Ackerman as Resident Engineer.

A. G. C. Convention

The Twenty-Third Annual Convention of the Associated General Contractors of America will be held in Seattle, Wash., on February 16 to 19, 1942.

New Literature Describes Heavy-Duty Wheel Tractor

The new Caterpillar diesel DW 10 tractor is featured in a profusely illustrated color broadside published recently by the Caterpillar Tractor Co., Peoria, Illinois. This heavy-duty high-speed wheel tractor is powered with a 6-cylinder 98-hp diesel engine and has five speeds forward, ranging from 2.4 mph to 18.1 mph. Construction features such as short turning ability, super traction, easy and safe operation are described and illustrated, brief specifications are quoted, and there is information on three pieces of matched equipment designed for use with the DW 10. These are the W10 hydraulically-controlled bottom dump wagon built by Caterpillar, the DLS cable controlled scraper built by R. G. LeTourneau, Inc., and the CW-10 hydraulically controlled scraper built by the LaPlant-Choate Mfg. Co.

Copies of this broadside may be obtained direct from Caterpillar.

Speed Up Construction
with
"Simplified" Welding
It's easy to do your metal construction work quicker, better and more economically . . . exclusive operation features of Hobart "Simplified" Arc Welder let you save time, labor and money. Repair equipment right on the job with a Hobart Gas Drive Welder and eliminate costly delays waiting for new parts. It's built to operate continuously, delivering the high quality welds that mean greater profit. Write for complete details.
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CEMENT DISPERSION
Guarantees SAVINGS
WRIGHT AERONAUTICAL AIRPLANE ENGINE PLANT, LOCKLAND, CINCINNATI, OHIO.
Albert Kahn, Associated Architects and Engineers, Detroit, Michigan.
Frank Messer & Sons, Inc., Cincinnati, Ohio, General Contractors.
Cement Dispersion employed in Pozzolith for mass concrete.

THROUGH SPEED AND HIGH EARLY STRENGTH

HIGH early strength concrete is an almost indispensable aid today in speeding up defense construction.

CEMENT DISPERSION, concrete's most important technologic advance in a decade — *through* POZZOLITH — produces 3 day normal strength in 24 hours, 7 day strength in 3 days, 28 day strength in one week — *25% more strength at later ages.*

And this — *with normal portland cement;* guaranteeing important savings and vastly improved structures.

Send for Research Paper No. 36 "Economics of Cement Dispersion" and complete facts on Pozzolith.

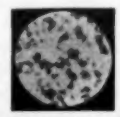
HOW CEMENT DISPERSION WORKS

Only a part of the cementitious value of the cement, whether normal portland or high early, is utilized under usual construction conditions. Investigation shows that with 28 days curing only 50% hydrates. [Anderegg and Hubbell, A.S.T.M. 29 II 554 (1929)].

Dispersed cement produces 25% to 40% higher compressive strengths.

WITHOUT POZZOLITH

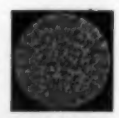
Cement particles in their normal state in water tend to gather in bunches; i.e., flocculate. Water never reaches some particles and many are only partly hydrated. This reduces the effectiveness of the cement, entraps water within the clumps, requires an excess of water for placement and often results in bleeding and segregation. See photomicrograph at right.


UNDISPERSED

WITH POZZOLITH

With Pozzolith the dispersion principle operates to drive each particle apart, thus exposing all the cement particles to the vital hydrating action. See photomicrograph at left.

This dispersion makes the cement usable to its maximum efficiency since all the water is made available for lubrication of the mix and the entire surface area is exposed for hydration.


DISPERSED

OTHER ADVANTAGES

1. Durability increased 50% or more.
2. Water reduction — up to 20% — slump increased 150% or more for given water ratio.
3. Increased water-tightness — 20% or more reduction in absorption and permeability.
4. Reduced bleeding and segregation.
5. Reduced heat with minimum cement content.

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3101 W. Grand Ave. Chicago, Ill.

Soapy Solution Stops Bleeding of Concrete

New "Wetting Agent" Used To Check Bleeding of Water From Concrete Pavement on U.S.-Michigan Highway 131

✦ FOLLOWING the results obtained by the Research Division on the durability action of the Michigan test road last year, the Michigan State Highway Department permitted the use of a "wetting agent" admixture of about 0.01 pound of a sulphated fatty alcohol per sack of cement on a paving contract to stop the bleeding of water from the concrete after finishing. The bleeding was caused by the rapid rate of sedimentation of the limestone aggregate and sand in the mix. As the quantity of the admixture to be used had been set only tentatively, within given limits, the Remus Construction Co., of Remus, Michigan, used varying amounts until the best quantity for the particular aggregate had been determined on its 8.209-mile concrete paving contract on U. S. 131 south of Kalkaska, Michigan. The concrete pavement is 22 feet wide and has a 9-7-9 inch section.

Preparing the Solution

Based on the experimental work which had been done, 7 pounds of the sulphated fatty alcohol Orvus, a product of Procter & Gamble, was dissolved in 20 gallons of water at the start of the work. This was later changed to 5.6 pounds per 20 gallons of water, and one quart of this solution was added to each 7-bag batch. The contractor had two 20-gallon containers, with covers and separate stirring devices, made and mounted on the side of the paver away from the operator's platform and toward the back, so that the admixture could be readily thrown into the skip. The stirring device was merely a disk about one-third the diameter of the container, mounted on a rod which extended up through the cover so that the solution could be agitated. A faucet on each container enabled the extra man required for the solution to draw off the one quart and toss it onto the dry batch as soon as it was delivered to the skip.

Effect on Concrete

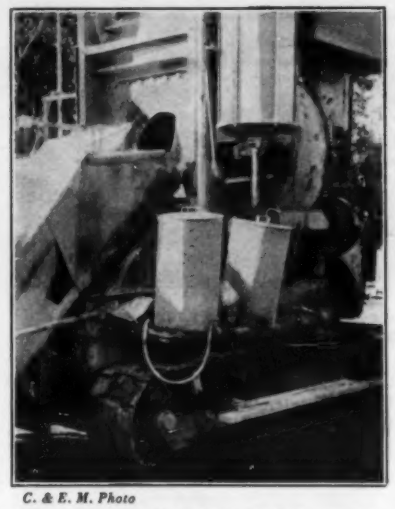
While the addition of this soapy solution to the mix was aimed to stop bleeding, which it did successfully, it also had other very interesting effects on the concrete. With the normal amount of water used for the standard rather dry mix, the concrete showed a 4-inch slump when tested as delivered direct from the paver. If tested 5 minutes later, it showed the required 2-inch slump. As delivered to the pavement, the top of the batch appeared somewhat fluffy and covered with soap bubbles. Test samples of the concrete show that it weighs less per cubic foot and consequently is not quite as strong as the standard mix.

Effect on Finishing

Inasmuch as the use of this admixture seemed to speed up the setting of the concrete, considerable difficulty was experienced at the start, as the finishers maintained their usual distance behind the paver. When they reached the section where the 7-pound solution was used, the concrete had practically set up and it was very difficult to complete the hand-finishing. Another difficulty was experienced when the 7-pound solution was used, namely that the concrete fluffed to such an extent that after finishing it settled as much as ⅛ to ¼-inch below the top of the forms, according to the contractor.

When the change was made to the 5.6-pound solution, these difficulties were eliminated. The finishing machine was able to operate right up under the boom of the paver because of the increased workability of the batch, and the hand finishers completed their day's run about 30 minutes earlier than with the standard mix. Another interesting sidelight was that it was found easier to clean the paver at the end of a day's run when the solution had been used than without it.

This material Orvus was not developed as a concrete admixture, but has proved successful for some time in dry-cleaning establishments, laundries, and rug-cleaning plants. Above 80 degrees Fahrenheit, Orvus, which the manufacturer states definitely is not a soap, is clear and amber-colored; while below 80 degrees it becomes mottled and pure white. It dissolves instantly in tap water, and does not form insoluble lime soap when used in hard water. As it is a stable material, it is not affected when used with alkalies.



C. & E. M. Photo

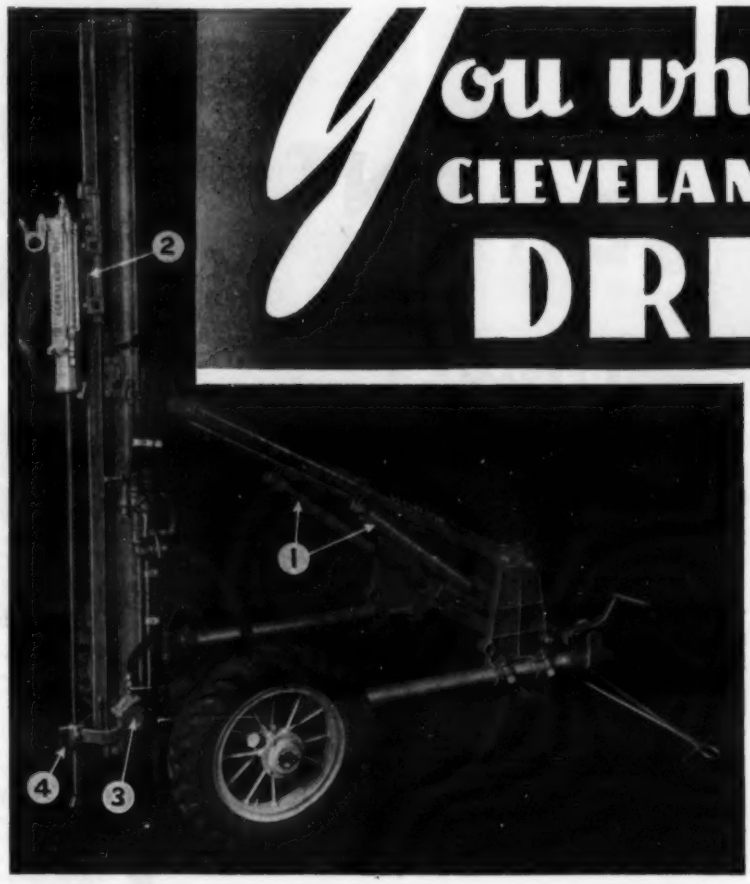
The two 20-gallon cans used for making the solution of Orvus on the Remus Construction Co. contract south of Kalkaska, Mich.

Limited experience with the use of Orvus indicates that temperature, atmospheric conditions and the amount of water in the mix have a considerable effect on the finishing. The amount of Orvus must be adjusted for these varying conditions.

Personnel

The use of Orvus was undertaken by Remus Construction Co., of Remus, Michigan, on its 8.209-mile paving contract which it received from the Michigan State Highway Department on its bid of $184,505. Michael Bauman, owner of the company, was in active charge of the work throughout. For the Michigan State Highway Department, G. Donald Kennedy, Highway Commissioner, the work was in charge of Lee D. Zimmerman, District Engineer, with W. R. Stanley as Project Engineer.

You who know CLEVELAND WAGON DRILLS



(1.) U-Bar raised and lowered through two jack screws—geared together—smoother and easier to set.

(2.) Drifter mounted on a slabback. The construction insures long wear of guides and more economical renewal.

(3.) Recoil device promotes faster drilling.

(4.) Improved centralizer.

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YOU wouldn't have believed it possible, but we have made the Cleveland Drill Rig, or Wagon Drill even better—faster in drilling, faster to move from one hole or position to another, better balanced, easier to get the "toe holes," longer lasting—than in any previous models. Model DR30, this latest and best of all wagon drills, has been in service, under severest conditions, for a year. Now rolling off the assembly lines, ready for you.

What makes it better? Double-screw — geared together — U-bar setting jack, smoother in action of raising or lowering. Center of gravity of the machine better placed; you can now get the toe holes without shifting the U-Bar on the frame. Slabback mounting for the drill facilitates economical renewal of worn guide parts. The DR30 can be placed, quickly and easily, in position for drilling any hole that the day's work may present.

With the Cleveland DR30 is the fast, easy, economical way to drill holes in rock ahead of blasting, especially if the yardage to be excavated is considerable. Let us know where to place a Cleveland DR30 on demonstration. May we send literature?

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LEADERS IN DRILLING EQUIPMENT

One of the new Wooldridge BB scrapers.

New Dirt Movers for Fast Loading, Dumping

The new Wooldridge Model BB dirt-moving scrapers, designed for faster loading and dumping, embody a number of new features, according to the manufacturer, Wooldridge Mfg. Co., Sunnyvale, Calif. It is stated that these new scrapers, although more rugged in construction, are nearly three-quarters of a ton lighter in weight, permitting larger loads and a greater heaped capacity. The BBR, the largest in the series, has a heaped capacity of 17¾ cubic yards.

An enlarged apron opening of 53½ inches results from a higher front apron lift, permitting the handling of greater volumes of dirt, bigger clods and larger pieces of rock. The new Dura-bilt construction features a huskier larger-yoke and inner-braced double one-piece bottom. With fewer sheaves and 42 feet less cable required, the new Wooldridge 3-line scraper is designed for considerable reduction in cable wear, upkeep and repair, the manufacturer states. Further simplification has been brought about by the elimination of the spring box and sixty parts.

Complete information on the BB series of Wooldridge dirt-moving scrapers may be secured by those interested direct from the manufacturer by referring to this item, or from this magazine.

Asphalt Institute Announces Four New Member Companies

Four asphalt producing companies were elected to membership in The Asphalt Institute at the recent Board of Directors' meeting in San Francisco. These companies, the Home Oil & Refining Co., Great Falls, Mont.; Husky Refining Co., Cody, Wyo.; Independent Refining Co., Billings, Mont.; and Yale Oil Corp., Billings, Mont., bring the total of Asphalt Institute membership up to twenty-nine.

The Asphalt Institute is a national association of asphalt producers, designed to develop and extend its uses through promotion, engineering activities and research. In the present national emergency, it has also been geared to the fullest cooperation in the construction of airfields, access roads, and the strategic military network of highways.

Diesel Shovel and Dippers Described in New Catalogs

The Bucyrus-Erie Co., South Milwaukee, Wis., manufacturer of the 54-B diesel convertible shovel, dragline and crane, suggests that a study of the pages of its new bulletin devoted to the 54-B will show you "what makes the wheels go 'round". It is profusely illustrated with photographs of major features and many of the minute details of construction, while the story of performance is told by visits to some fifteen different jobs, with pictures of the 54-B at work under practically all conditions. In addition, there are several pages of facts, including complete specifications and working ranges.

Another vest-pocket sized booklet, entitled "Shovel Output Begins With the Dipper," tells about the importance of dippers to shovel output and presents all the facts about B-E dippers. Many pictures are included showing both construction details and performance.

Copies of both these catalogs may be obtained from the manufacturer.

WET Jobs?
Dry Subgrades Guaranteed with
GRIFFIN WELLPOINT SYSTEMS
Whether you Buy or Rent!
BOTH Equipment and Dry Jobs are Guaranteed — Let us prove that GRIFFIN EQUIPMENT IS BETTER!
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ALL STEEL HAND HOIST
SEATTLE, U.S.A.

COMPACT—POWERFUL—SAFE
"For use where power is not practical or available"
Manufactured in 2, 5 and 15-Ton Sizes.
For capacity comparison, ½" cable used:
2-Ton "Lightweight" ..... 75 ft.
5-Ton "General Utility" ..... 250 ft.
15-Ton Triple-Geared "Special" ..... 1200 ft.
Patent instant gear change and positive internal brake that never fails, and will lock load.

Gear Ratios	Weight	Price, f.o.b. Seattle
2-Ton 4, & 22 to 1	60 lb.	$ 50
5-Ton 4, & 24 to 1	110 lb.	$ 75
15-Ton 4, 19 & 109 to 1	680 lb.	$250

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2724 6th Ave., So., SEATTLE, WASH.
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WHEN THE NATION NEEDS HIGHWAYS IN A HURRY!

One of the marvels of this modern age is our hundreds of thousands of miles of national highways. They are not only essential to our commercial, industrial and cultural development, but are indispensable to national defense. More important today than ever, the building of roads goes on continuously. In this important factor in our national welfare, GOHI Corrugated Pipe plays its part, by providing long-lived, low-cost drainage structures in a hurry! Installation is quick, easy, permanent.

Write today for your 72-page GOHI Book, containing data on the use of GOHI Corrugated Pipe for every drainage requirement. Address the fabricator near you.

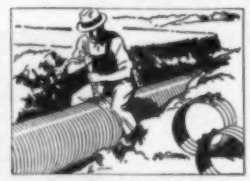
New England Bolt Co.	Everett, Mass.
Central Culvert Co.	Ottumwa, Iowa
Capital City Culvert Co.	Madison, Wis.
Bancroft & Martin Rolling Mills Co.	S. Portland, Me.
Denver Steel & Iron Works Co.	Denver, Colo.
The Lane Pipe Corporation	Bath, N. Y.
Dixie Culvert Mfg. Co.	Little Rock, Ark.
St. Paul Corrugating Co.	St. Paul, Minn.
The Newport Culvert Co.	Newport, Ky.

GOHI PIPE CORRUGATED

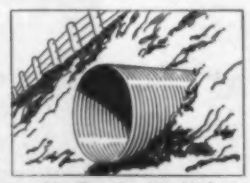
GOHI Pipe meets Copper-Bearing Pure Iron requirements in all specifications published by nationally recognized specifying authorities.

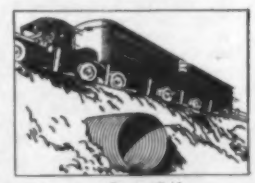
Minimum Excavation

Low Handling Cost


Low Installation Cost

Minimum Backfill


No Repairs, No Upkeep


Long Life

GOHI CULVERT MANUFACTURERS, INC., . . . NEWPORT, KY.

C. & E. M. Photo

Emptying galvanized-iron baskets of cement in the windrows.

Fargo Airport

(*Continued from page* 19)

men worked, first laying out a chain with red bunting tied to mark the spotting for each basket of cement which was dumped on top of the windrow just ahead of the traveling mixer.

Mixing the Windrows

The sand and gravel with the clay as dumped by the trucks was shaped up into a continuous narrow uniform windrow about 4 feet wide and 3½ feet high before the cement was placed on top. This shape fitted the wings of the traveling mixer and it minimized the spillage around the wings as the machine gathered in the windrow for mixing. Water for the mix was supplied at from 1 to 2 per cent above the optimum moisture to allow for evaporation. The Soils Engineers noted that when the moisture was above this amount the material would slip on the discharge belt of the mixer, which gave an excellent rule-of-thumb method of insuring that there was not too much moisture in the mix. The contractor maintained three tank trucks to supply water to the Jaeger traveling mixer, and one extra with spray bars and a small Jaeger pump to apply a fog of water to the mixed windrow and also to the material as spread whenever it showed signs of drying out under the hot sun and dry winds before it was thoroughly compacted. The water for all of the work was furnished by the city of Fargo.

A crew of seven men worked ahead of the traveling mixer, shoveling up any material which had been knocked over from the windrows and which had spread out beyond the opening of the mixer wings. As the mixer proceeded down the windrows it towed one of the 1,500-gallon tank trucks, and with its own pump took water from the tank truck, delivering it to the two 750-gallon storage tanks on the mixer. Any overpumpage of water was returned to the tank truck.

As the traveling mixer moved down the windrow the operator steered it to insure its being centered over the windrow, one man sat on the tank truck and watched the delivery of water so as to signal the next truck to come in at the right moment, and one man watched the windrow as it was taken up by the spiral feed of the mixer to be sure that none was lost outside the wings.

Finishing Operations

Within one-half hour after the windrow had been mixed with the cement it was required that it be spread. This was done by a Caterpillar No. 12 which cut about one-third of the windrow and spread it to the side, then took another third and spread it toward the other side, and then evened up the middle. Two laborers worked along the edges, keeping the newly spread material from making a ridge at the forms by shoveling back the material pushed up onto the forms and doing the same against a newly completed strip which took the place of forms as work progressed. From this point on, the sequence of operations was varied considerably, depending on conditions. An orchard cultivator was run through the material to take out the wheel tracks made by the power grader in spreading the material. This was done so as to give uniform compaction under the sheepsfoot rollers. As soon as the sheepsfoot tamping roller began to walk up out of the soil-cement mix, one of the No. 12 power graders bladed over the material to the approximate cross-section and filled in the holes left by the feet of the roller. This was followed immediately by an over-sized pneumatic-tire roller to test out the cross-section, during which time the grader would go over the material to be sure of the crown and then the rubber-tired roller would continue until complete compaction had been secured. The

(*Concluded on next page*)

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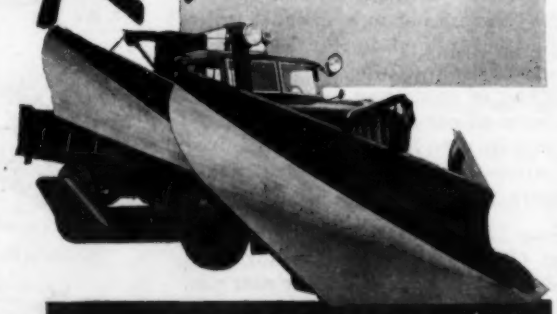
Equipped with the standard spade blade, this tool will show amazing results for digging in hard clay, hard pan, frost, or shale in open trenches, tunnels, and sewers, and for the sinking of caissons to bedrock.

Write for Bulletin 25

HARDSOCG DRILL CO. OTTUMWA, IA.

YOU CAN'T "Keep 'em Rolling"—

UNLESS YOU Keep the Roads Open!



WALTER SNOW FIGHTERS *with* **4-POINT POSITIVE DRIVE**

- Automatic Lock Torque Proportioning Differentials
- Suspended Double Reduction Drive
- 10 to 1 Range Transmission, 6 speeds forward, 2 reverse, powerful low gear, fast high gear, single lever control

It will take more than a slogan to "Keep 'em rolling" when blizzards begin to pile up the drifts. Hard work on the part of highway crews and the most efficient snow removal equipment—nothing less—can keep the roads open for the movement of defense materials, military supplies and troops.

Meeting emergencies is everyday business for WALTER SNOW FIGHTERS. For years, in the heaviest snow belts of America, they have proved their ability to carry on under conditions that stop all other types of equipment. They are specially engineered for heavy snow clearance. They have the exclusive WALTER 4-POINT POSITIVE DRIVE. This provides torque to the four powerful driving wheels according to the traction of each wheel at any instant. Entirely automatic, it makes ample power constantly available to plow through drifts without stalling.

If you want to "keep 'em rolling"—keep the roads open with WALTER SNOW FIGHTERS. Send for literature.

WALTER MOTOR TRUCK COMPANY

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RIDGEWOOD, QUEENS, L. I., N. Y.

C. & E. M. Photo

The oversize pneumatic-tire roller had seventeen tires for compacting the soil-cement mix.

Fargo Airport

(*Continued from preceding page*)

pneumatic roller, built by the contractor under the Bros patents, consisted of a heavy-duty motor truck with eight tires mounted on the rear axle, with four on the drive shaft and the other four idling, and then a semi-trailer with nine wheels, loaded with rock to give the required compaction.

When the surface had been brought to complete compaction with the pneumatic roller, a John Deere spike-tooth harrow pulled by a pneumatic-tired Allis-Chalmers tractor was pulled over the surface to form a mulch for the final rolling with the 6½-ton Austin tandem roller to give a smooth surface and then ended it up with the pneumatic roller for the finish. Water was added at regular intervals as required to maintain the moisture content of the material and to prevent its drying out. In each case a small amount of material was wasted at the end of each run, and this material was shoveled into the next windrow and again mixed with cement as the value of the cement already added had been lost by that time.

At times when the tractors were busy on other work and could not start the sheepsfoot rolling immediately after the blading and initial turning over of the material, the tractor and scarifier were kept going through the mixed and spread material to insure a uniform moisture content throughout when sheepsfoot rolling actually started. As soon as the final rolling with the pneumatic roller was completed, the surface was given a final sprinkling and covered with Sisalkraft paper, which completed the operation on the material.

Personnel

The original contract for 19,000 cubic yards of soil-cement runway 6 inches thick and 142,000 cubic yards of Lift A and Lift B base and shoulders respectively was awarded to McCree & Co. of St. Paul, Minn., on its bid of $312,000. The work is being done under the direction of the United States Engineer Department St. Paul District Office, Major J. W. Moreland, District Engineer, with W. C. Lincoln as Resident Engineer, and William Tueting Jr. as Soils Engineer. For the contractor, the work is in charge of P. A. Bradbury as Superintendent and Arthur Miller, Engineer. W. P. Tarbell, City Engineer of Fargo, N.D., is in charge of WPA operations on drainage.

Because of shortages due to the Defense Program, careful maintenance and proper lubrication are more important than ever, to lengthen the life of your equipment.

New Booklet Shows Way Of Conserving Metals

The defense demands for the conservation of metals, as well as the shortage in machine tools and skilled labor, have placed a new emphasis and value on any process whereby metals may be conserved and the service life of machines and metal parts extended. Because of this, a new book "The History, Purpose and Practice of Metallizing" has just been issued by the Metallizing Co. of America, 562 West Washington Blvd., Chicago, Ill.

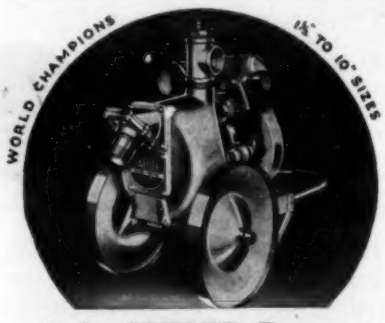
Metallizing is a trade name which was applied to the process of metal spraying a number of years ago and can be used in place of tinning, galvanizing, calorizing, electro-plating, or welding for rebuilding and resurfacing parts. Its applications reach into practically every industry, and its uses for salvaging and reclaiming worn parts in engines, tractors, and parts are equally applicable to construction equipment. Many shops and foundries throughout the country are equipped to do this type of work.

Copies of this book on the Metallizing process, describing the process and illustrating its many applications may be secured by those interested direct from the Metallizing Co. of America by referring to this item.

Safety Equipment Catalog

The American Optical Co., Southbridge, Mass., manufacturer of products to protect and conserve eyesight, has recently published a new 111-page safety equipment catalog. Complete protection from head to ankles is provided by the safety items described which include industrial goggles, Calobar lenses, Super Armorplate lenses, welding lenses, plates, helmets and hand shields, safety clothing, respirators, first-aid kits, etc.

Copies of this catalog may be obtained without charge by writing direct to the manufacturer and mentioning this item.



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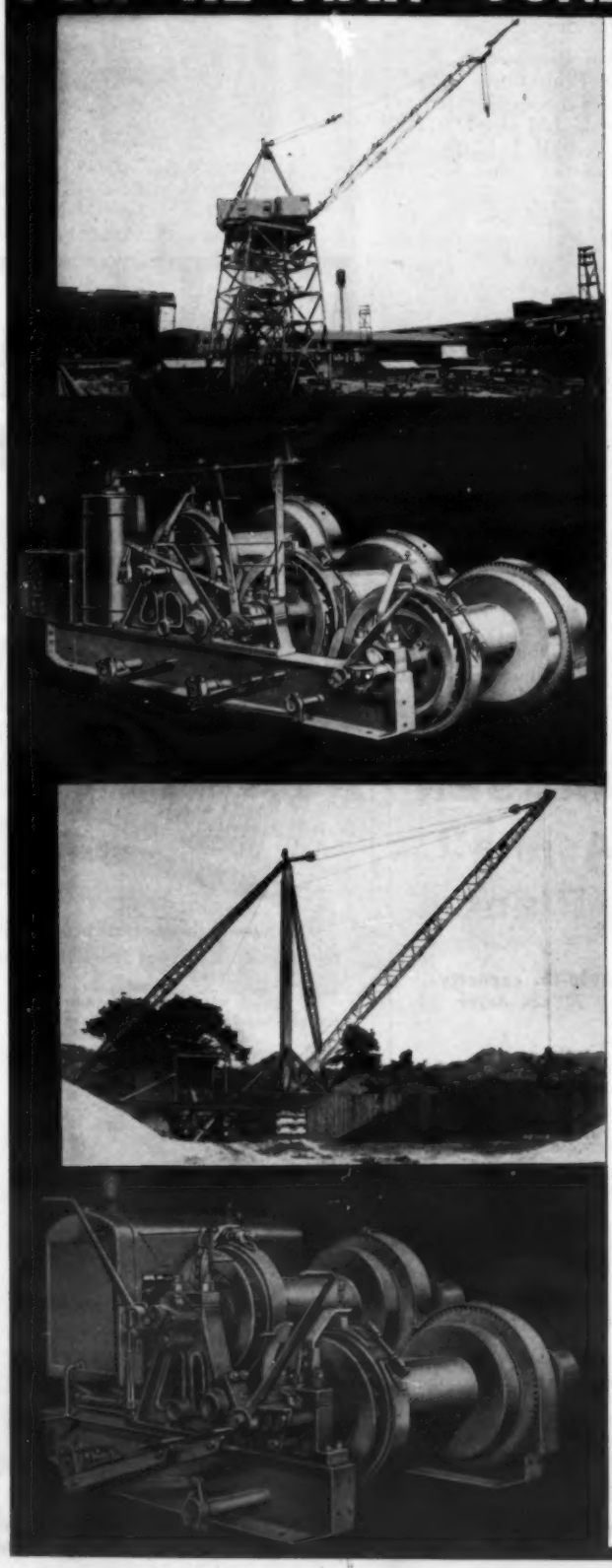
191 Dublin Ave., Columbus, Ohio

FOR "HE-MAN" CONSTRUCTION JOBS!



When the going is tough and you have a big job on your hands . . . then, more than ever, you'll need Clyde Quality Equipment. Hoists, Derricks and Whirleys that are designed to perform and built to endure . . . real "he-man" equipment for "he-man" jobs.

Clyde Whirleys . . . scientifically engineered to keep pace with the fast moving schedule of today's huge construction projects . . . ships, dams, locks or bridges. Seven standard sizes with lifting capacities up to 140,000 lbs. at a 35 ft. boom radius or 22,000 lbs. at 150 ft. Power can be electric, Diesel, steam, gasoline or Diesel-electric. Write for Bulletin K-12.

Clyde Electric Hoists are available in one, two and three drum types in sizes from 5 to 200 H.P. with line pulls from 1000 lbs. to 20,000 lbs. They are built with generous, easily adjusted brakes and frictions, wide bearings, husky shafts, and rigid, one piece steel bed frames . . . important factors toward greater safety, efficiency and economy of operation. Bulletin K-3 contains complete specifications.

Clyde Steel Derricks are designed to meet all the requirements in the construction and industrial fields for high quality, dependable derricks. All details have been given careful consideration in regard to materials, design and workmanship. Clyde guy and stiff-leg derricks range in capacities from one to 100 tons with boom lengths from 20 to 100 ft. Write for Bulletin K-9 for detailed information.

Clyde Gasoline Hoists are also built in one, two and three drum types in sizes from 8 to 120 H.P. and with line pulls from 1500 lbs. to 14,000 lbs. Similar in design to Clyde electric hoists, they embody the same outstanding features that make Clyde hoists first in the field. For details of construction and complete specifications, write for Bulletin K-4.

CLYDE

CLYDE IRON WORKS, Inc.
DULUTH, MINN.

The Lakeshore Sand Slinger.

New Sanding Unit For Icy Highways

The Lakeshore Sand Slinger, made by the Lakeshore Machinery & Supply Co., 400 West Laketon Ave., Muskegon, Mich., is designed for attaching to any truck to spread sand on icy highways. A controlled distribution of the material spreads it at any speed from 4 to 20 miles an hour, distributing it evenly over an 18-foot strip while driving in the right-hand lane.

A positive-action direct-gear drive transmits power from the wheels to the distributing disk. A conical non-clogging hopper receives the material from the truck body and provides a free flow of material to the disk. Both hopper and disk are mounted to permit controlled distribution. All that is necessary is to loosen four nuts and revolve the hopper and throat disk to the desired relative position. With this easy adjustment, light or heavy sanding, or the distribution of chlorides, cinders or chips is accomplished. A low distribution level is maintained, just above the wheels, to minimize interference with passing traffic. An agitator in the hopper feeds the disk and prevents materials from clogging, and the entire weight of the distributing disk and the load on it are supported by a ball end-thrust bearing equipped with a Zerk grease fitting.

The Sand Slinger has a wide wheel base and is equipped with two 4.00 x 8 wide non-skid diamond-tread tires. A universal attachment makes it easy to mount on any truck, and trailing hooks permit safe easy attaching when the Slinger is in transit.

Further details on the Lakeshore Sand Slinger are contained in a folder, copies of which may be secured by interested contractors and state and county highway engineers direct from the manufacturer by mentioning this item.

Winter Concreting On New Flood Wall

(*Continued from page* 11)

on this section where it was impossible to get a tractor of the required weight between the wall and the excavation side slopes, the material was compacted by a Chicago-Pneumatic tamper with a 12-inch stroke, driven by a C-P compressor, to insure a firm bed to prevent any movement of the sheet piling.

Forms

The forms for the walls in Section 3 were made up of 1 x 6 tongue-and-groove for the lower lift below ground level, and on the T-wall section the planks for the cut-off forms were left in the ground on the inside. Therefore old planks were used on the inside and regular plank panels were used on the outside. The remainder of the form was made up of 1 x 6 lumber in 26-foot panels 8 feet high, using 2 x 6 studs spaced 12 inches on centers and 2 x 6's double for wales. Universal Form Clamp Spiroloc ties were used with ½-inch rods left in the walls. Three Mall mechanical vibrators were used in the concrete during placing.

Personnel

Section 3 of the Binghamton, N. Y., Flood Protection Project was awarded to L. B. Strandberg & Son, contractor of Chicago, Ill., on the bid of $93,971.10. Throughout the work, R. Leichtfuss was Superintendent for the contractor. The work was done under the direction of the Binghamton Office, U. S. Engineer Department, Lieut.-Col. J. C. Marshall, District Engineer, with D. E. Mather as Resident Engineer.

Growth of Air Reduction Co.

Air Reduction, Lincoln Bldg., New York City, has recently released a booklet "Air Reduction—A Quarter Century of Progress," giving a brief history of the organization and growth of Air Reduction and its five subsidiary companies. The book has many interesting illustrations and has been designed to give a quick over-all picture of the welding and cutting apparatus and supplies produced by Air Reduction and the use of these products in industry and defense. In the back of the booklet is a chart, printed in color, that graphically illustrates the many markets to which this company's products are distributed.

Copies of this booklet may be obtained without charge by writing direct to the manufacturer and mentioning Contractors and Engineers Monthly.

Metal-Working Manual Available for Laymen

The need for training new men in modern metal-working operations for national defense has brought forth the "New Encyclopedia of Machine Shop Practice", a 576-page volume designed for popular use in schools, factory reference libraries, and for home study. The book, which costs only $1.98 and contains nearly 1,000 illustrations and an appendix of handy tables, is written in plain language, understandable by the layman, and avoids deep technicalities and difficult mathematics. It is a particularly useful book for men in the construction industry who would like to improve their knowledge of metal-working and machine-shop practice.

The book was prepared under the direction of George W. Barnwell, Professor of Production Practice at Stevens Institute of Technology, with the assistance of a score of practical experts in the respective divisions of the work. Copies may be secured through this magazine or direct from the publisher, William H. Wise & Co., 50 West 47th St., New York City.

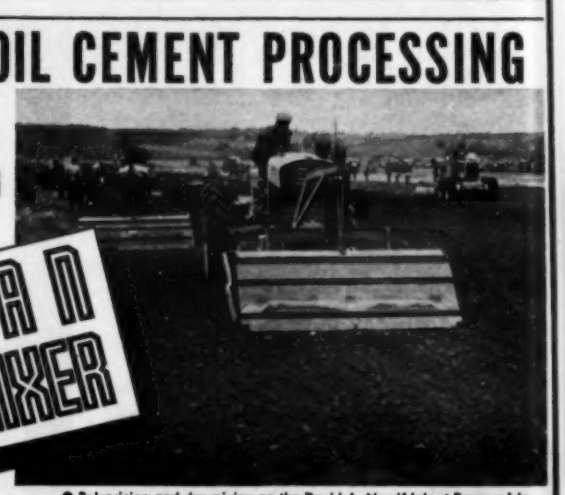
A New Warco Diesel Or Gas

The new WARCO Hydraulic Power Controlled Motor Graders have all the Modern Features for best motor grader performance: Leaning Front Wheels, Reversible Blade, High Bank Sloping Position, Maximum Visibility. Available with either Diesel or Gasoline Power Units.

WARCO W.A. RIDDELL CORPORATION BUCYRUS - - OHIO

SPEED UP SOIL CEMENT PROCESSING

Do Your IN-PLACE MIXING with the SEAMAN PULVI-MIXER



● Pulverizing and dry mixing on the David A. Nassif job at Presque Isle — Seaman MHD-72's at work.

The answer to the biggest problem in soil cement processing — thorough mixing at schedule-making speeds—is the Seaman PULVI-MIXER. Here's what it means to you:

UPPER—Finishing wet mix on Windsor Locks airport job—D. W. Winkleman, contractor.
LOWER—Stabilizing base for a Tennessee highway near Winchester.

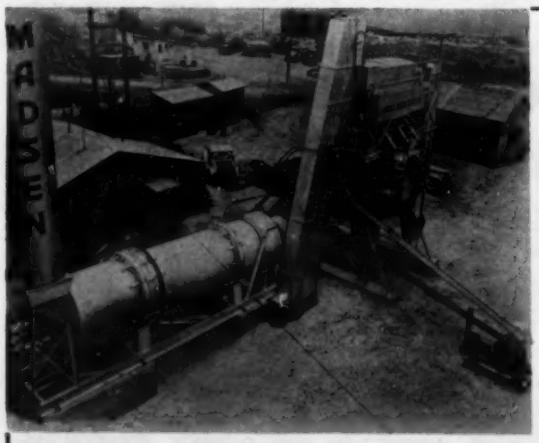
★ FEWER PASSES... Pulvi-Mixer's rapidly revolving tines do a more thorough mixing job in one pass than discs, cultivators or blade graders can do in many.

★ UNIFORM MIXING... Cement (and water, too) is uniformly dispersed throughout the *entire* mix, not laid in furrows or layers as it is with blades or discs.

★ LATERAL MIXING...Pulvi-Mixer's *exclusive* angled tine mounting provides thorough lateral mixing, assuring uniformity the full width of cut, every pass!

YOU'LL BE DOLLARS AHEAD to get the facts about this answer to your in-place mixing—on oil or soil cement. Write or wire for complete information.

SEAMAN MOTORS MILWAUKEE WISCONSIN



MADSEN Asphalt Plant

3000-lb. capacity 72"x24' dryer

The plant complete, including the hot stone elevator, Symons vibrating screen, dust elevator, dust screw, 3000-lb. twin-shaft pug mill mixer and asphalt gun, is driven by a 75-hp. motor. A 30-hp. motor drives the dryer.

Step Up on Production—Step Down on Maintenance!

MADSEN Asphalt Plant Equipment, always a leader and recently greatly improved in design by MADSEN Engineers, will enable you to step up your production and cut down your costs.

MADSEN's far simpler transmission arrangement handles from a single power source, if desired, the driving of all the component parts of the plant; this function being accomplished with fewer chain drives, fewer sprockets, fewer gears and less footage of line-shafting than any other plant built with a single power input.

Simplicity and sturdiness—these are the reasons why, ton for ton, MADSEN asphalt plant maintenance is lower than that of other makes.

MADSEN mixers have heavier wearing sections—built of superior materials and designed to take the wear where it is most severely imposed.

The new MADSEN asphalt gun is the greatest improvement in asphalt equipment in twenty years.

MADSEN plants are built in sizes ranging from 500 pounds to 6000 pounds per batch, assuring every contractor of suitable equipment for his own special production requirements.

MADSEN IRON WORKS, 5631 Bicket St., Huntington Park, Calif.

New Traffic Book Has Engineering Approach to Problem

A new study of traffic problems entitled "Traffic Accidents and Congestion" by Maxwell Halsey, Associate Director, Bureau of Street Traffic Research, Yale University, has recently been published. Setting forth the principles which underlie the scientific methods currently being developed to reduce traffic accidents and congestion, this volume approaches traffic problems from the engineering point of view and is intended not only for traffic students but for those professionally engaged in traffic and highway engineering.

Beginning with the basic principle that automotive transportation is essential to organized modern society, Mr. Halsey sets forth as his first principle the statement that efficient automotive transportation, not accident reduction, is the fundamental problem. Reducing traffic problems to their three fundamentals, which are the driver, the car, and the street or highway, Mr. Halsey emphasizes the necessity of coordinating these three factors of mobility.

Any maladjustment in any one of these factors makes for traffic inefficiency, which results in congestion and traffic accidents. According to Mr. Halsey, the modern motor car is so far ahead of both the driver and the roadway that it has actually caused difficulty. Intrinsically safe in construction, it not only can not be blamed for any appreciable part of motor accidents, but it even reduces the severity of injury in accidents because of its construction. As far as drivers are concerned, Mr. Halsey believes that they can contribute very little to the reduction of traffic accidents. Therefore, the major improvement in the transportation system must come through improving the conditions under which vehicles must be operated.

Mr. Halsey says, "At the present time the roadway lags behind the cars in terms of capacity for volume and velocity, and lags behind average drivers in terms of mental and physical abilities. The revamping of existing roadways and the provision of new roadways to provide safe and rapid travel is the modern challenge to the highway engineer in his efforts to balance the transportation equation. This challenge is particularly stimulating because of the economic values at stake and the new methods of economic justification being developed."

Since the burden of the solution of the problem comes on the highway engineer, Mr. Halsey has some valuable suggestions to make in the set-up of a traffic engineering division, under the control of an engineer. In state government, the logical location for such a division is in the state highway department, ranking in importance with other department divisions such as construction, maintenance, etc., so that the traffic division is represented at staff meetings. In cities, it is urged that either a separate traffic engineering commission be established, or that the traffic engineering division come under the city engineer or official in charge of the city's engineering problems. Again and again it is stressed that traffic is an engineering problem, not a police problem, a safety problem, or an administration problem.

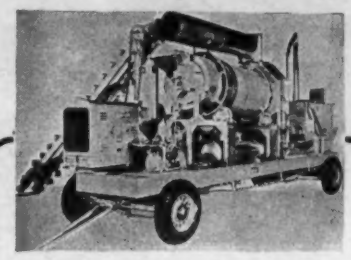
The book is divided into five parts: Part I deals with orientation and outlining the problem; Part II with organization and administration; Part III, with fitting engineering to the driver; Part IV, design remedies; and Part V, how to attack the problem. In addition, there is a general reference list on traffic, and a directory of traffic engineers throughout the country.

Copies of this interesting and thought-provoking book on traffic problems and their solution may be secured direct from the publisher, John Wiley & Sons, Inc., 440 Fourth Ave., New York City, or from this magazine. Price: $4.00.

Catalogs on Portable Conveyors and Loaders

Three new catalogs, recently issued by The Jeffrey Mfg. Co., 970-99 North 4th St., Columbus, Ohio, include No. 758, devoted to its portable belt conveyors; No. 759, describing Jeffrey portable bucket loaders; and No. 761 on Jeffrey portable scraper conveyors. The line of portable belt conveyors includes troughed and flat-belt types for the low-cost handling of all classes of loose material, according to the manufacturer. The bucket loaders are constructed for reclaiming sand, crushed stone, and other loose materials from ground storage; and the scraper conveyors are wheel and crawler-mounted types in various lengths, with gravity or retarding-type chutes; for use in industrial plants.

Each catalog is profusely illustrated and contains complete data, including specifications, on the equipment it covers. Copies may be obtained by writing direct to the manufacturer and mentioning this magazine.



PORTABLE ASPHALT PLANTS

Write for Catalog

White Mfg. Co.

Elkhart Indiana

PILE HAMMERS and EXTRACTORS

HOISTS—DERRICKS WHIRLERS

Special Equipment
Movable Bridge Machinery

Write for descriptive catalogs.

McKIERNAN-TERRY CORP.
19 Park Row, New York

Distributors in Principal Cities

SIZE is no PROBLEM with WELDED CONSTRUCTION

13-YARD 2-YARD

FOR many years Pettibone Mulliken have been making large size welded dippers for coal stripping. Experience gained in designing and fabricating these larger sizes has enabled Pettibone Mulliken engineers to build smaller dippers from ⅜ to 5 yds.; incorporating in them the same rugged strength quality and the same weight saving features that are responsible for the success of the larger sizes.

Today shovel manufacturers and users are getting greater capacity from their shovels by using PMCO Welded Dippers.

PMCO WELDED DIPPERS

THE WEIGHT SAVED IN THE DIPPER GIVES INCREASED CAPACITY TO THE SHOVEL AS HIGH AS 30%

We operate the largest and most complete manganese steel foundry in the United States

PETTIBONE MULLIKEN CORPORATION

Established 1880

4710 West Division Street, Chicago, Illinois

The steel and reinforced-concrete viaduct at San Rafael carries the highway over the railroad tracks.

New Viaduct Carries Road Over San Rafael

(*Continued from page* 14)

gaff—and it has to. Once in a while a pile will snap, and the chock load on the rope is terrific. If it gives way, we lose a lot of valuable time re-outfitting. But that isn't the main thing. If the rope plays out, as all rope does sooner or later, preformed rope isn't cranky and we won't have an accident caused by an ordinary cable whipping into one of our men".

At the south end of the job a total of 65,514 linear feet of Douglas fir piles, of which 10,762 feet were treated, and 595 feet of concrete piling were driven by a barge-mounted derrick and on the balance of the job by a P & H crane.

Forms and Concreting

With the pile driving well under way, Heafey-Moore and Frederickson & Watson went to work on the forms. They set up the yard where most of the forms were pre-cut before being taken to the viaduct site for erection. Plywood sheeting was used exclusively.

All concrete was taken from a commercial plant located near the project and hauled to the job in Jaeger 3-yard truck mixers mounted on Ford cab-over-engine trucks. On footing pours, the truck mixers delivered the concrete direct to the forms, and on the columns, the concrete was rehandled by 1½-yard Gar-Bro buckets on a P & H crane feeding the hoppers of the elephant-trunk chutes.

An unusual feature of this work was the provision to make the superstructure flexible. A circular-arc depression was formed in the footing at the juncture of the column, then painted with asphaltic paint to prevent bonding between footing and column when the latter was poured.

A different method was used on deck concreting. A portable ramp was constructed, and the trucks backed onto this structure and discharged directly into a Madsen 4-yard 2-compartment bin. Concrete buggies of about ¼-yard capacity then transported the concrete to its destination where it was consolidated by Viber electrically-operated vibrators. Expansion joints in the deck were placed from 88 to 154 feet apart. After pouring, the concrete was leveled with a hand strike-off, and finished with a float. A non-skid texture was given by means of a hand broom, and some hand finishing was done at the edges.

The average pour on the deck was 180 cubic yards a shift, with perhaps 200 yards when everything ran smoothly. After the concrete in one section was set, the ramp was rolled forward.

An interesting design feature was incorporated in one side of the deck of the flat-slab spans. During construction ½-inch reinforcing bars were installed in the slab and allowed to project out along the side about 8 inches. After the concrete was set, a 1-foot section was poured along the edge, with a V groove formed at the bottom juncture of the deck and the addition. This provides a cold joint and will enable the state to widen the viaduct later, with a minimum of damage to the existing structure. The curbs are 1 foot 9 inches wide, with a 10-inch concrete rail.

Personnel

The contract for the San Rafael viaduct was awarded to Heafey-Moore Co. and Frederickson & Watson Construction Co., for whom Otto Bonnesen was Superintendent, with Martin Zimmerman as Carpenter Superintendent and X. V. Reynolds in charge of concreting. Tom Ferneau was Resident Engineer for the California Division of Highways.

In spite of a great deal of weather, mostly bad, the work progressed rapidly. For two months it rained practically constantly and the stream bed along the center line carried small torrents and played havoc with some of the formwork. But at the end of March the project was more than 65 per cent completed, with 5,000 of the total 11,000 cubic yards of concrete in place. The work was finished early this month.

Respirator Protects Against Rock Dusts

A new respirator designed to afford maximum protection against the inhalation of pneumoconiosis-producing and nuisance dusts has just been announced by the DeVilbiss Co., Toledo, Ohio. Approved by the U. S. Bureau of Mines, the new DeVilbiss MSD respirator is said to embody a number of unusual features which combine to make it compact, light in weight, easy to breathe through, comfortable to wear and easier to clean and maintain than previous models.

In this new respirator, a scientifically and compactly designed cartridge, measuring only 2⅞ x 1½ inches and weighing but one ounce, provides more than 41 square inches of breathing and filtering area. Ingenious multi-vane construction allows every inch of this filter to be used efficiently. This means no air restriction to cause difficulty in breathing, plus greatly increased filtering efficiency, the manufacturer states. The MSD respirator is designed to fit, closely and without leakage, the contour of practically any face, an important feature, as full protection depends upon a proper fit. The filter is easily cleaned by blowing accumulated dust from the vanes with an air dusting gun or nozzle.

A new folder describing and illustrating this DeVilbiss respirator in greater detail may be secured by those interested direct from the manufacturer by mentioning this item.

Welding Materials for Reclaiming Worn Parts

Amsco welding products, made by the American Manganese Steel Div., American Brake Shoe & Foundry Co., Chicago Heights, Ill., for reclamation, hard-surfacing and repairing of ferrous equipment parts, is the subject of a new bulletin recently issued by this company. It is reported that the number of replacements necessitated by the shocks, pounding and scraping to which crawler idlers and sprocket wheels, gear, dipper and bucket teeth and lips and other construction machinery parts are exposed, can be reduced considerably by protecting them by hard-facing, or reclaimed by building up the worn portions with Amsco Build-Up welding rods.

The bulletin is illustrated and presents informative data on Amsco Build-Up, Mo-Mang and hard-surfacing welding rods, Economy hardface, Dieweld, and Amsco filler bars and shapes, repointers and wedge bars. Also included is a page devoted to hard-facing applications by the electric and acetylene methods. Copies of this Bulletin, No. 941-W, may be obtained by writing direct to the manufacturer and mentioning this item.

New Snow-Plow Bulletin

"All-Out Defense Against Winter Hazards" is the title of a new folder describing Good Roads Champion snow plows and spreaders for ice control.

Copies of this folder may be secured direct from the Good Roads Machinery Co., Kennett Square, Penna.

Placing Concrete In Pavement Construction.

We Make Over **200** Gasoline Engine Air and Electrically Operated Portable Power Tools and Attachments

Give any workman this powerful, yet easily portable tool and he'll place low-water-cement-ratio concrete faster, better and cheaper. He'll save you time, labor, and lumber on every form building job, above or below grade. He'll achieve a better finish on any concrete surface, faster and with less effort. And, he'll handle the other 6 jobs with equal speed and economy.

The swivel-fitted, interchangeable tools for each of these tasks can be changed as easily as bits in a brace. The 3 H.P. variable speed, gasoline engine provides ample, low-cost power for each application—runs by itself and starts readily in cold weather. Contractors who have used this equipment would not be without it. Write TODAY for full details and ask for a FREE Demonstration.

MALL TOOL COMPANY

7743 SOUTH CHICAGO AVE. CHICAGO, ILL.

Offices and Distributors in Principal Cities

Here's why you get **LOWER CABLE REPLACEMENT COSTS** *WITH* **HEIL** *TWIN-CABLE SCOOPS*

Shorter Cable Lengths—Fewer Sheaves—and Jack-Arm Leverage Principle reduce Cable Replacements

Eliminate excessive cable replacement costs and increase your operating efficiency by switching to Heil Cable Scraper Equipment. The comparative chart below demonstrates that Heil Twin-Cable Scoops use shorter lengths of cable than other popular makes of scrapers. It shows, too, why cables last longer on Heil Scoops—Fewer sheaves and the elimination of reverse bends reduce the twisting and wearing action on cables and give you longer cable life. In addition, Heil design reduces line pull on the cables by using mechanical leverage to raise the bowl and to dump the load.

It will pay you to investigate these *extra features* of Heil Twin-Cable Scoops that make cables last longer and give you lower operating costs. See your nearest Heil distributor or write, wire or phone us today.

Push-loading speeds up Heil Twin-Cable Scoop operations at Montgomery, Ala. Airport.

Above: Heil Bulldozer used for log-piling in Ulster, England.

SCRAPER	No. of Sheaves	BOWL LIFT	Cable Req'd For 12-Yd. Unit	
			Lift Line	Dump Line
HEIL	18	Jack Arm & Cable	60 ft.	70 ft.
Scraper A	34	All-Cable	165 ft.	155 ft.
Scraper B	20	All-Cable	225 ft.	175 ft.
Scraper C	22	All-Cable	100 ft.	80 ft.
Scraper D	35	All-Cable	25 ft.	272 ft.
Scraper E	31	All-Cable	95 ft.	110 ft.

THE HEIL CO.

MILWAUKEE, WIS. • HILLSIDE, N. J.

Heil Twin-Cable Scoops dump quickly and spread the load evenly.

Hoisting Machinery Catalog

The O. K. Clutch & Machinery Co., Columbia, Penna., has recently issued a catalog illustrating and describing as completely as possible the various types of standard O. K. hoists. Constant improvement, it is reported, based on actual performance records and the needs of users, enables this company to offer a complete selection of modern hoisting machinery ranging from 8 to 150 hp, and powered with gasoline, electric or diesel engines. Complete specifications are given for a-c and d-c motors and there is a page headed "Useful Data For Users of Hoisting Machinery" which includes formulas for finding horsepower, rope pull and rope speed, the capacity of any drum for rope, and some helpful tables.

Copies of this bulletin may be obtained by writing direct to the manufacturer and mentioning this item.

Portable Air Compressors

Schramm, Inc., West Chester, Penna., recently issued a new catalog, printed in color, describing and illustrating in complete detail the various types and sizes of portable gasoline-engine and diesel-engine-driven Schramm compressors. All mountings are available, ranging from skid to motor truck, and for each size and type complete compressor and engine specifications are given. According to the manufacturer, the compressors shown reflect the summation of thirty years of progress in portable compressor design.

Copies of this catalog, No. 42-P, may be obtained by writing direct to Schramm, Inc., and mentioning this item.

New Shop-Forge Bulletin

A new bulletin on Hauck portable oil or gas-burning forges for rivet heating, blacksmithing, and similar work, has recently been issued by the Hauck Mfg. Co., 116-126 Tenth St., Brooklyn, N. Y. Included in this line is a new fuel-oil burning forge for blacksmith and pipe shops available in three models.

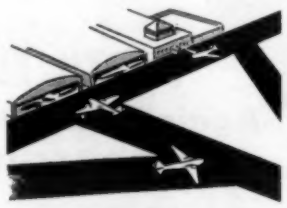
Copies of this new bulletin No. 353 may be secured by interested contractors and state and county engineers direct from the manufacturer by mentioning this magazine.

National Defense jobs that can be done *better, faster at low cost* with STANDARD OIL ASPHALT

● Some few county and state highway officials may be directly concerned with National Defense highway plans. There is a very good reason why all highway officials should concern themselves with these plans.

The greater percentage of defense funds must be spent for equipment and projects of military value only. But projects such as widening highways and bridges, improving secondary road systems and building airports, which are classed as defense measures, are equally important to your community for normal peace-time needs.

Right now speed and low cost are of utmost importance. If you have any part in carrying out these National Defense projects, consider these advantages of Standard Oil Asphalt.



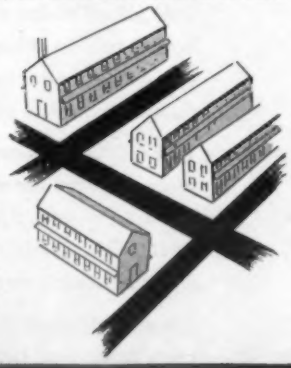
AIRPORT RUNWAYS

Adequate landing fields are urgently needed. Safe, all-weather Asphalt runways can be laid quickly. In most instances local materials can be used, which further speeds up the work and reduces the cost of Asphalt construction.

Airports built now for training and other defense measures will also be an asset to your community after they are no longer needed for defense.

CANTONMENT STREETS

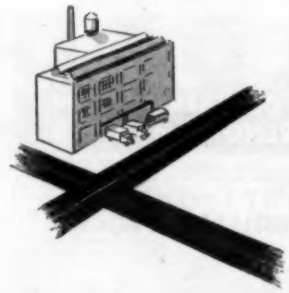
Various low-cost types of Asphalt construction are ideally suited for cantonment streets where an improved all-weather surface is needed. Asphalt can be easily maintained for as long as it is needed, and can be abandoned at any time without a great investment loss.



HIGHWAY WIDENING

As an emergency measure, highway widening will provide adequate capacity wherever traffic flow is increased by defense activity without the delay and expense of constructing new roads which may or may not be required in normal times.

Asphalt construction offers the fastest and simplest method of increasing highway capacity by widening. Not only can it use local aggregates, but Asphalt can be laid with little interference to traffic.

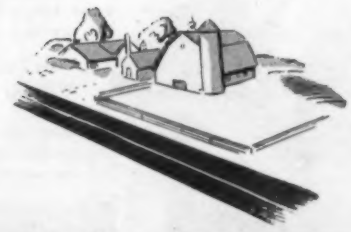


SECONDARY ROADS

Many miles of secondary roads will become of primary importance for moving manufacturers' products from plant to plant or plant to consumer and in bringing food and supplies from farmers to processors or consumers.

These roads must be passable at all seasons. Time and expense can be saved by using Asphalt construction to build up these "farm to market" or secondary road systems.

Wherever Standard Oil Asphalt products are sold, there is an Asphalt Representative who can give you full information about these and other uses of Asphalt. Write Standard Oil (Indiana), 910 South Michigan Avenue, Chicago, Illinois.



Asphalt for every purpose STANDARD OIL COMPANY (INDIANA)

Old Montana Route Rebuilt, Modernized

(*Continued from page 9*)

Camp and Repair Work

Working two 8-hour shifts each day, LaLonde employed an average of fifteen men to a shift on grading operations, with the crew increased to about twenty-five when the crushing and screening plant was set up.

The contractor's camp was located near the borrow pits, where the men were housed, fed and the equipment repaired. A mechanic was equipped to make most of the repairs commonly needed on jobs of this type right on the spot. Before each shift, each piece of equipment was fueled, greased and inspected. Manufacturers' recommendations for greasing and oiling the equipment were followed, with the result that most costly breakdowns were avoided. Preformed wire rope on the Osgood shovel and the scraper prevented unnecessary time out for cable repairs.

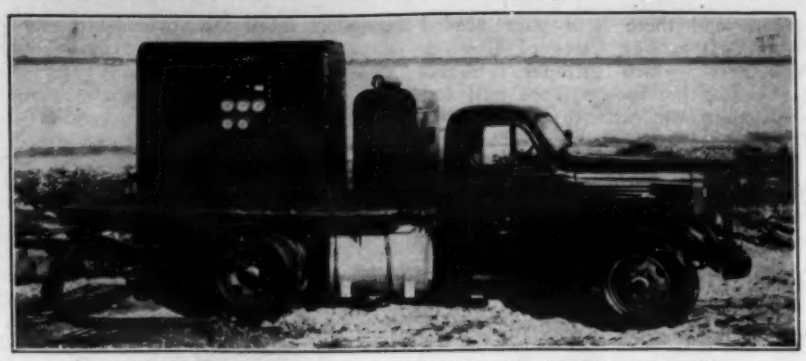
Major Quantities

The major items and unit bids for this contract, which was awarded on the contractor's bid of $133,547, were:

Item	Quantity	Unit Price
Unclassified excavation	220,230 cu. yds.	$ 0.30
Culvert excavation	734 cu. yds.	1.50
Overhaul	371,344 mi.-yds.	.01
Crushed gravel, base course	38,233 tons	.80
Grade A gravel, top course	19,195 tons	.80
Stone chips	1,825 tons	3.00
Binder soil	2,800 cu. yds.	.25
Overhaul on binder soil	5,600 mi.-yds.	.125
Water	2,000 M gals.	1.00
Rolling	450 hours	2.00
SC-4 asphalt	118,130 gals.	.10
Processing (lump sum)	6.004 mi.	700.00
Processing road approaches	328 sq. yds.	.50
Tack coat with SC-2 asphalt	7,438 gals.	.10
Seal coat, 95-penetration asphalt	40,590 gals.	.12
15-inch r-c culvert pipe	112 lin. ft.	2.00
24-inch r-c culvert pipe	884 lin. ft.	4.00
30-inch r-c culvert pipe	200 lin. ft.	5.50
36-inch r-c culvert pipe	76 lin. ft.	7.00
Class A concrete	6.40 cu. yds.	35.00
Reinforcing steel	600 lbs.	.065
No. 48 metal flume	49.323 lin. ft.	10.00
Treated lumber	0.300 MFBM	130.00
Lumber in head gates	0.320 MFBM	130.00
Hand-laid riprap	7 cu. yds.	5.00
Wood station markers (each)	32	2.00
Concrete R/W monuments	24	2.00
Stockpiled gravel	900 tons	.80
Snow fence rebuilt	527 lin. ft.	.15

Personnel

In charge of the work for the Albert LaLonde Co. on this $133,547 grading, relocation and bituminous-surfacing project was J. LaLonde, son of the contractor. Ray Chester of Choteau was the representative of the Montana State Highway Commission on the job.



A truck-mounted Sterozone water purification unit of 9,000-gpm capacity.

New Water Purifier Is Readily Portable

A completely automatic self-contained water purification plant, designed for use in army camps and for troops on maneuvers but which is also adaptable to construction camps and isolated jobs, has recently been announced by the Technicraft Engineering Co., Los Angeles, Calif.

Known as Sterozone, this unit has a rated capacity up to 9,000 gph, and automatic parallel operation of units can be made to supply larger requirements. Raw water is pumped from the source through a filter to remove suspended matter and then passed to an absorber chamber where ozone, generated by a high frequency silent electric discharge, oxidizes the bacterial contamination and delivers pure fresh water which has no taste or odor, according to the manufacturer.

Power is supplied by an automatic gasoline-engine-driven 10-kva 220-volt three-phase power plant. This unit is self-starting and self-regulating, the only attention required being that of lubrication and fueling. All mechanism is driven by a 5-hp 220-volt three-phase electric motor on which is direct-mounted the treated-water supply pump and coupling. Connected to the other end is the raw water supply pump. Also driven from the motor shaft by V belt are the compressor, cooling-water circulating pump and the evaporative cooler. All of these mechanical elements are mounted in a separate power chassis, vibration-insulated from the rest of the unit on a three-point rubber suspension, and carried on ball-bearing rollers for ease of inspection and removal for lubrication or maintenance. Operation of the unit is fully automatic. A small synchronous electric motor drives time dials which control the cycle and periodically reverse the raw water filters and the air dehydrators.

Complete information and specifications of the Sterozone unit may be secured direct from the manufacturer by mentioning this item.

Want information? Write the Editor.

Bulletin on Pile Driver And Pavement Breaker

Bulletin C-86, issued by the Hardsocg Drill Co., 227 So. Benton St., Ottumwa, Iowa, describes and illustrates its No. C-86 paving breaker and C-86 pile driver. The paving breaker is a valveless machine weighing 83 pounds, 29 inches in length overall, and capable of delivering 64 cubic feet of air at 80-pounds pressure. Being valveless, it has the advantage of fewer parts, and a definite point of cut-off regardless of the timing of two parts which may change with different pressures. According to the manufacturer, it is easy to operate, has little vibration and is fully air cushioned. It can be fitted for the use of 1⅛ x 6-inch or 1¼ x 6-inch shanks.

The pile driver weighs 60 pounds and the weight of the breaker when fitted with the attachment is about 125 pounds. It is used to drive sheet piling up to 3 inches thick through hard soil or any place where piling will penetrate.

Copies of this bulletin may be obtained direct from the manufacturer.

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"NOW WE'RE ALL HAPPY! —THE BOSS BOUGHT A NEW WILLIAMS BUCKET"

"I have been operating cranes for 10 years," writes A. G. Grupe, veteran crane operator for the Edison Fuel and Materials Co., Chicago, "and have never used a better bucket. The boss always has a big smile when he sees me come up with material spilling over the sides."

Operators and bosses all prefer Williams. Williams Welded Construction means longer wear . . . less breakage; faster work . . . more yardage! Williams buckets operate year in and year out with practically no cost for maintenance and repairs.

Write for Free Bulletins on any of the 11 types of Williams buckets. Distributors in all parts of the country.

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WILLIAMS *Buckets*
built by WELLMAN

MONTHS *Ahead of Schedule at* CHEROKEE DAM

One of the three Smith 4-yard Front End Charging Mixers discharging a batch of concrete.

SMITH TILTERS
Again Live up to their Reputation for SPEED and EFFICIENCY

Construction progress on TVA's $34,000,000 Cherokee Dam is well ahead of the short 20-month schedule set for its completion. A highly efficient personnel organization . . . plus well designed, dependable equipment . . . account for the remarkable results achieved on this important National Defense Project.

The T. L. Smith Company is proud of the fact that Smith Tilters were selected for mixing all the concrete . . . proud, also, that these three 4-yard machines have already mixed approximately 800,000 cu. yds. of concrete during the first 8 months, thereby establishing new records for efficiency and dependability.

For more than 40 years, Smith Tilters have set the pace for concrete mixers on big engineering projects. All sizes available.

Write for catalog 160-A.

THE T. L. SMITH COMPANY
2857 North 32nd Street, Milwaukee, Wis., U. S. A.

SMITH MIXERS
USED ON THE WORLD'S GREATEST CONCRETE PROJECTS

Removing Snow, Ice From Oregon Roads

(*Continued from page 17*)

When the Storm Begins

At the inception of a snowstorm, push plows are started out. This equipment works with successive crews night and day during the duration of the emergency. When extreme conditions are encountered, rotary plows are used. The rotaries are also used to widen out the trenches formed by the push plows.

A great deal of care is exercised to keep drainage functioning. The ditches are not cleared of snow because experience has indicated that the water will flow in the ditches without freezing underneath the snow banks, whereas if the ditches are cleared, they are soon jammed with ice and the water flows over the road.

Snow removal is an expensive operation but it is a very necessary procedure because of the dependence of many people on motor transport. It is not unusual to have at one location through the mountains as much as $75,000 worth of equipment and as many as 40 men engaged in snow removal for about three months of the year, as all reasonable means are used to safeguard the motorists who drive the Oregon highways in the winter time.

When the blizzard is raging in fury, the state highway section forces are patrolling the roads in subzero weather so that the motorist will find them open and clear at daybreak the following morning. The closure of highways may cause not only inconvenience but, in sections not served by rail, actual want and privation. Therefore every possible effort is made to keep an open road at all times on the main highways in the state of Oregon.

Progress at Shasta; Will Be 602 Feet High

Shasta Dam's official maximum height from the bedrock foundation to the roadway on top will be 602 feet, it was recently announced by the Bureau of Reclamation, following completion of the lowest excavation in the ancient gorge of the Sacramento River. This dam will be one of the highest structures of any kind in California, exceeding by at least 150 feet the tallest skyscrapers of San Francisco and Los Angeles.

Shasta's length will be about 3,500 feet, or two-thirds of a mile, and its maximum thickness at the base will be about 580 feet. Sound bedrock was reached about 100 feet below the former river bed, at Elev. 475.5 at the deepest point, and the top of the dam is to be at Elev. 1,077.5. This will make Shasta the second highest dam in the world, topping Grand Coulee by 52 feet. Tallest of them all is Bouder Dam at 726 feet.

Measured in cubic yards of concrete, Shasta will also rank second in the world. From that standpoint, the three largest concrete structures built by man are Grand Coulee, with 11,250,000 yards; Shasta, 6,000,000 yards; and Boulder 4,400,000 yards.

Construction Engineer Ralph Lowry announced on November 15 that 2,210,000 yards of concrete has been placed in Shasta. The contract for the construction of Shasta dam and power plant, which is held by Pacific Constructors, Inc., is 62 per cent complete.

Tractor Disk Harrow For Low-Cost Road Work

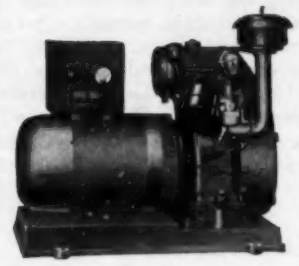
With the increasing emphasis on stabilized road bases, contractors have turned to types of equipment used in the agricultural field for pulverizing and mixing the soil as required in the stabilization process. Among such equipment which has been adapted to road work is the Blount tractor disk harrow made by the Blount Plow Works, Evansville, Ind.

This harrow is made specifically for use with a tractor, is furnished in 7⅛ and 9½-inch spacings, with 18, 20, 22 and 24-inch blades, either round or cut out. The gang frames are high above the axles to provide maximum penetration and clearance, and the cross draft bars on the tandem may be adjusted to give the gangs any desired set. The adjustable tie bar for the tandem gangs extends from outside to outside and holds each gang in proper relation to the other, permitting free action no matter how short the turn, and allowing for adjustment of gangs to prevent ridging. Deep or shallow penetration in the center is controlled by a steel snub block. An adjustable steel hitch stand makes it an easy job for one man to connect the harrow to a tractor. When not in use, the stand is hooked to the front frame bar.

Literature describing this Blount tractor disk harrow, which has already been used on a number of road jobs, may be secured by interested contractors and engineers direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Buy Defense Bonds and Stamps.

BETTER RESULTS *with* STERLING



HOISTS
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There's a reason why the largest contractors select Sterling Hoists, Pumps and Lighting Plants for their most important jobs. Contractors everywhere have found they can do more work at less cost with Sterling Construction Equipment because Sterling's fully developed, thoroughly tried and proven design assures dependable performance.

Sterling Construction Equipment on your job means increased production and larger profits.

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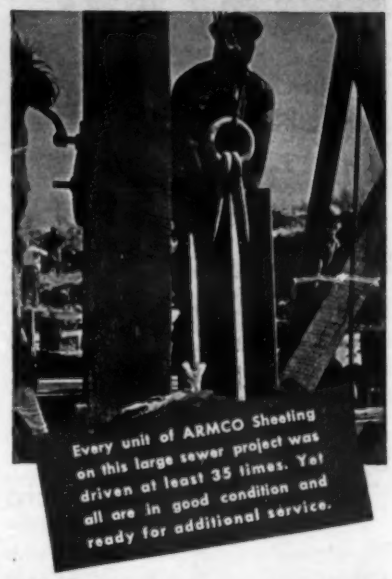
DRIVEN 35 TIMES ...STILL A-1 SHEETING


Every unit of ARMCO Sheeting on this large sewer project was driven at least 35 times. Yet all are in good condition and ready for additional service.

Many contractors and engineers know from experience that ARMCO Sheeting has what it takes for repeat performances. It is readily pulled and can be used again and again.

Naturally this high salvage value means low material costs on trenches, cofferdams, foundations and similar works. You need less sheeting for big jobs. On smaller projects you save by moving ARMCO Sheeting from job to job, thus eliminating the expense of new material. Between jobs the nestable units take up little storage space.

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There is a gage and type of ARMCO Sheeting to meet every requirement. Write us for data regarding its practical application to your jobs. ARMCO DRAINAGE PRODUCTS ASSN., 5012 Curtis Street, Middletown, O.

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(RENEWABLE)

made of wear-resisting MANGANESE STEEL

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Write for Bulletin No. 115

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N. B., A two dollar bill, check or postage stamps will be entirely acceptable.

A 4 to 6-foot Jaeger widening finisher, with the end shoe set in for a 2-foot 3-inch strip, striking off and widening behind the spreader box on an Indiana road job.

Speedy Finishing On Widening Strip

Finishing 7,800 feet of 2-foot 3-inch concrete widening strip in 11 hours with a three-man crew is the record made recently by the Brooks Construction Co., Fort Wayne, Ind., on its widening contract on U. S. 24, east of Peru, Ind. The entire job behind the paver was handled by the finishing machine operator, one luter and one edger.

The contractor used a Jaeger widening finisher which is simply a small finisher designed for work up to 6 feet in width. It is equipped with a two-speed transmission for a working speed up to 18 fpm and a screed speed up to 50 cycles (100 strokes) a minute. Power is supplied by a 4 to 5-hp air-cooled engine. The mix from the 27-E paver was fed through a spreader box, equipped with a vibratory pan, drawn by the paver and sliding on the form and one edge of the slab. The widening finisher, following under its own power, then struck off and finished the strip.

With this economical and speedy setup, the Brooks Construction Co. completed over 50 miles of widening strip this past season.

A New Safety Check On Steel Paint Jobs

How often have you experienced rust spots popping up after steel has been painted for just a few months? The rest of the job may be all right, but these spots do occur. Every maintenance man knows that these are points of weakness in the paint film, places where for some reason or other the surface has not been properly cleaned and brushed free of all the loose rust scale and old paint. The use of Paratex Metal Primer is said to overcome this entirely, through lateral absorption.

When Paratex Metal Primer is applied over scales of rust and paint that do not have true adhesion to the surface, the lack of adhesion is exposed by the rust or paint scales curling up as the primer dries. The result is that before the finish coat is applied, the painter will note these curled-up edges, will re-scrape them and re-wire-brush them, and spot-coat-prime them before proceeding with the finish coat. This makes Paratex Metal Primer a safety check on a paint job, as it shows up surface preparation defects in 12 hours instead of the painting going ahead and allowing the defects to show up naturally in three to six months.

Complete information on this new primer and lateral absorption will be found in Bulletin No. 518, which you may secure from The Truscon Laboratories, Detroit, Mich., by mentioning this item.

Forms for Concrete Pouring Described in New Catalog

A new catalog on steel forms for concrete pouring has recently been issued by the Blaw-Knox Co., Pittsburgh, Penna. This 60-page booklet is profusely illustrated and there are construction photographs of many large concreting projects now under way, or just recently completed. Included in the descriptions are forms for circular, elliptical, horseshoe-shaped and box-shaped conduits; vehicular tunnels; walls; piers; dams; caissons; and bridge centering; and the new Blaw-Knox latch-type hand-handled forms are also described and illustrated.

Those interested may obtain copies of this catalog by writing direct to the manufacturer and mentioning this item.

Truck-Mounted Scrapers Described in Catalog

The Monarch Road Machinery Co., 328 Front St., Grand Rapids, Michigan, has recently issued a catalog devoted to its truck under-body scrapers. The Model FH-40, for village, township, and secondary roads, is 8 or 9 feet long for mounting on 1½-ton trucks. According to the manufacturer, it maintains 8 to 15 miles an hour, raises to clear 8 inches above the road, has fixed flexibility which eliminates chatterbumps, controlled spring blade action, and hydraulic operation. Interchangeable with this standard flat moldboard and blade is a special curved moldboard and cutting bit for heavy scraping in clay, gumbo, or gravel, or for the fast removal of light snow and slush ice.

Copies of the catalog describing and illustrating these scrapers may be obtained direct from the manufacturer.

Throughout the Nation • OWEN BUCKETS are
DIGGING
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Coal • Coke • Sugar Beets • Etc.
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OWEN CLAMSHELL BUCKETS INSURE A BIGGER DAYS WORK

ASPHALT MIXING PLANTS
H B
Portability and large capacity go hand in hand in the new Model M-H Bituminous Batch Mix plant. Three wheel mounted units, two of which may be hauled by any standard tractor—are easily moved and set up on small tonnage jobs. Ample capacity is provided by full size 2500# pug mill mixer. Will meet most State and Federal specifications for standard bituminous mixes.
Stationary and gravity type portable plants are also available in batch capacities of 300# to 8000#.
Further details upon request.
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Line & Surface LEVEL
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Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.
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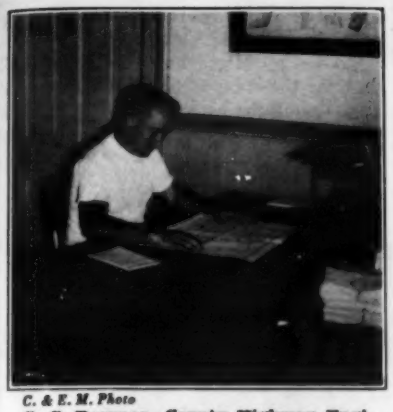


C. & E. M. Photo
C. C. Bowman, County Highway Engineer of Jackson County, Iowa, studies the county highway program as plotted on a county map.

Maintaining County Roads and Machines

(Continued from page 7)

addition, under the new Farm-to-Market appropriation from the gas tax funds, which must be used for construction, Jackson County received approximately $60,000 last year. By leaving this money with the state as a separate construction fund and having the state award the contracts, with the county doing the engineering, an additional $5,000 of Federal-Aid secondary road funds was secured.

For maintenance the county secures about $88,000 from a property tax, and $1,400 on the motor carrier tax.

Maintenance

The county has its own crusher and during the height of WPA activities it did considerable graveling of county highways by running its own crusher and using WPA labor. Now all of this work is done by contract.

For surface maintenance the county has one grading unit for each two of its eighteen townships. The light maintenance units consist of a 4-wheel pneumatic-tired tractor with a pulled blade. They also have heavier outfits pulled by 40 to 75-hp crawler tractors for ditch cleaning. These heavier outfits have a roving commission and each one covers about six townships.

The bridge maintenance crew has a 1½-ton truck for hauling its supplies and an 1,800-pound pile hammer which is operated by the truck itself instead of by a power winch.

Repair Garage And Yard

A central repair shop is maintained in Maquoketa, while there is a rented storage shed for equipment in about half of the townships. These sheds are used to store gasoline as well as the equipment operating in those townships.

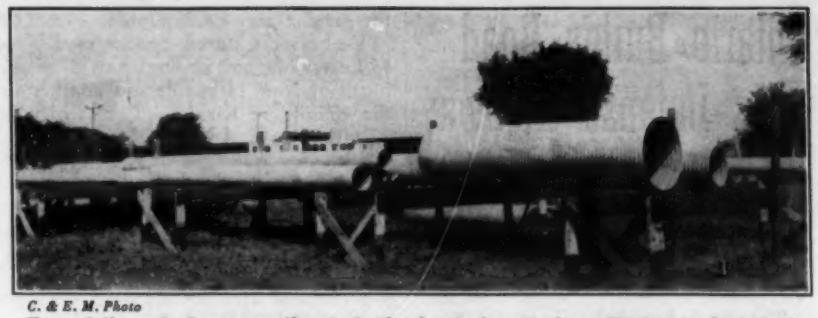
The storage garage is in two sections. One long narrow section is sufficient for the storage of five trucks as well as extra tires and grader blades. During working hours when the trucks are out on the road, the welder frequently uses this as a shop for himself because of the excessive amount of smoke resulting from the electric welding and the fact that there is considerable congestion in the repair shop proper. The personnel of the shop consists of a Shop Superintendent, the welder and three helpers, aided by the equipment operator whose machine is in for overhaul.

In the repair shop is a 50-pound power trip hammer, a blacksmith forge and anvil, a 14-inch lathe with a 4-foot bed, a drill press, a Black & Decker electric drill, a bar bender, a garage compressor, a Weaver mechanical press, and an oil-dispensing rack at waist height. A small office is provided for the Shop Superintendent and in this are maintained the storage bins for small parts.

In the northeast section of Maquoketa is a storage yard with a long open shed for truck storage and in the center an enclosed section with storage for oil, nails, survey stakes, and a saw rig for making the stakes, as well as facilities for dispensing oil to the equipment which makes the yard its headquarters. Outside in the yard is a well-planned set of storage racks for culvert pipe which keep the pipe off the ground and store it at truck height so that it can be readily rolled onto a truck pulled up alongside. In the yard also is a considerable stock of treated and untreated bridge lumber and piles.

Organization

In Jackson County, Iowa, three Supervisors are elected for three-year terms, with the election in alternate years. The Board of Supervisors appoints the County Engineer for a term not to exceed three years. C. C. Bowman, the present County Engineer, was Assistant County Engineer from 1926 to 1939, and has been County Highway Engineer from that time to the present.



C. & E. M. Photo
Toward the end of summer, the stock of culvert pipe was low. Storage on frames at truck-body height is a feature in the county yard at Maquoketa, Iowa.

As an example of the planning and diplomacy which must go into the work of a County Highway Engineer, Mr. Bowman was hard at work on his new three-year program when we dropped in to interview him. Later, during the interview, a property owner from a few miles out of town dropped in to ask about prospective work on the highway nearest to his property and whether the route would be changed in the new program. He was further very anxious to have the county gravel his private road from the existing county road to his door yard. Mr. Bowman very diplomatically pointed out that the county could not afford to gravel from the county road up to every man's garage and that it is a lot better to have a graveled county road 200 feet away from your garage than it is to have it 2 miles away.

New "8-Point" Folder on Le Tourneau Equipment

A new folder, entitled "8 Extra Profit-Making Facilities Provided By Your LeTourneau-Caterpillar Dealer" has recently been published by R. G. LeTourneau, Inc., Peoria, Ill., and Stockton, Calif. This 4-page folder introduces two new LeTourneau products, preformed Tournarope and Tournaweld electrodes, and also describes and illustrates the Tournacar welder, repair steels made to the exact specifications and same shapes and sizes as used in the manufacture of LeTourneau equipment, and two types of blades for Carryalls. Information is given on LeTourneau-Caterpillar parts and service facilities, and field engineering service which is available for analyzing and making recommendations on your job.

Copies of this folder may be obtained by writing direct to the manufacturer and mentioning this item.

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Waterproofed Tarpaulins
YOUR GUARANTEE GENUINE PARA PURE PARAFFIN BASE WATERPROOF TREATMENT
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. . . for PEAK PRODUCTION
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BENTON HARBOR MICHIGAN

Ontario Builds Road As Defense Highway

(*Continued from page 2*)

sary to sod all of the back slopes; and sand is put on the fore slopes to stabilize them.

Stabilized Subgrade

The clay subgrade has been stabilized quite generally with 1 to 2 feet of local sand from borrow pits scattered along the highway in hauls running from 1 to 6 miles. On the sand, from 6 inches to 1 foot of gravel or crushed limestone, depending on the source of material which is nearer, has been placed on the road and thoroughly compacted by hauling over the material at all times. Maintainers are kept going over the stabilizing material to fill the ruts and keep a uniform surface with a slight crown. Following this, the highway, which is 90 per cent on new location, has been opened to traffic for further compaction, and then the following year has generally been fine graded and paved.

Hot-Mix Paving

After the surface has been fine graded, it is given an intensive rolling with 12 to 15-ton 3-wheel steam rollers before the hot-mix base and surface is laid. Plant mix is used, with a 3-inch base course with 1½-inch down to ¾-inch aggregate and from 5 to 6 per cent asphalt, followed by a similar mix 2 inches thick compacted by as many as five rollers. The top is of 200 mesh to ⅜-inch aggregate with 6 to 7 per cent asphalt.

The 3-inch base is laid down 21 feet wide, the 2-inch base course is laid 20 feet wide, and the 1-inch top course the same as the intermediate base course. All material is spread with mechanical spreaders in two 10-foot lanes, with the machines running together one just ahead of the other. The hot-mix material is laid between 3 x 6 timbers staked to the subgrade with iron pins, using 2 x 6 lumber for the 2-inch base, the 6 inches of lumber at the edge giving the step-in on 3-inch base.

Snow Plowing

Since this highway serves a highly active gold and copper mining district, it is necessary to keep it clear of snow in winter so that adequate highway facilities to and from the growing towns of the district may be available.

V-plows are stored, two units at New Liskeard, one unit at Englehart 27 miles north of New Liskeard, and another in the vicinity of Kirkland Lake which is 57 miles north of New Liskeard, the Division Headquarters of the Highway Department.

The slow-moving tractor plows of the V type and with wings are put into service where it is known that the drifting is bad; trucks, also equipped with V-plows and with but one wing, are kept at New Liskeard and are rushed out as required to handle moderate snowfalls. The truck plows are used during the storm, but if the storm becomes too bad all plowing is stopped until it has abated. Then the heavy tractor plows are put out to break through.

During the winter of 1940-41, the snowfall was 7 feet, with the worst fall a 24-hour storm accompanied by high wind during which 18 inches of snow fell. The snow in this territory is nearly always dry and drifts very readily. At the end of last winter, the snow banks were 12 to 15 feet high at either side of the road. Because snow accumulates to such a great extent, the early plowing of the road is done all the way out to the ditch, and then during the latter part of the winter the plows keep winging the top of the pile of snow outward. In this way the snow plows are kept busy plowing during storms, and widening and moving the tops of the piles between storms. There is no rotary plow in the New Liskeard Division.

Personnel

The Ontario Department of Highways is operated under the direction of the Hon. T. B. McQuesten, Minister of Highways, and R. M. Smith, Deputy Minister.

New Driller's Handbook

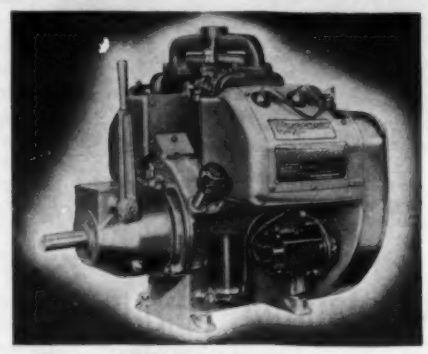
The Fourth Edition of the Driller's Handbook, issued by the Cleveland Rock Drill Co., 3734 East 78th St., Cleveland, Ohio, is now ready for distribution. Among the valuable information contained in this book are ideas on how to get more work out of your drills, drill rigs, paving breakers and other pneumatic equipment, and suggestions for saving money in the operations of such tools.

Copies of this Handbook may be secured free by interested contractors who write direct to the manufacturer, giving the type and make of drills and other pneumatic equipment being used on their jobs.

Mobile Air-Controlled Cranes

One of the features of Michigan mobile cranes is the high-speed air controls which are designed to move heavy loads quickly, precisely and safely. Other features of these cranes are their complete mobility, low center of gravity for stability, and heavy-duty motors for economical power.

Copies of Michigan's Work Book C showing these convertible mobile cranes in action may be secured direct from the Michigan Power Shovel Co., Benton Harbor, Mich., by mentioning this magazine.



Model VE-4
4 cycle 4 cylinder V-type, heavy-duty, air-cooled engine . . . delivers 22 hp. at 2600 R.P.M.

Draft Horses!

It figures out this way: 22 hp. packed into a 285-lb. heavy-duty engine, or 13 lbs. of compact engine weight for each husky horse-power. That's the sensational Wisconsin VE-4!

Harness this eager, dependable power to your kind of equipment and the kind of work you want it to do . . . the way it should be done. Detailed data on request. Write: Dept. F-12.

MOST POWER PER POUND
HEAVY-DUTY AIR-COOLED ENGINES

by WISCONSIN MOTOR CORPORATION
Milwaukee, Wisconsin, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

Defense Materials and Supplies **MUST NOT BE DELAYED**

Highways Must Be Kept Open

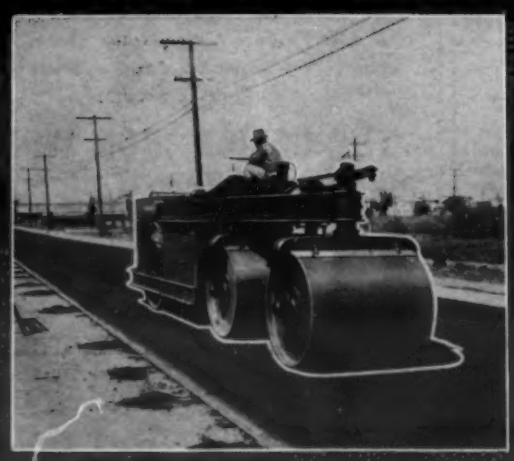
The National Emergency means men and materials *must* be moved . . . snow blocked highways, slowed traffic cannot be tolerated now! Trucks, troops, military supplies must find open roads this winter . . . everywhere and at all hours.

Your responsibility this winter is more than local. Your roads and streets are no longer yours alone but part of a great national network that must be ready for the large and sudden demands of the National Defense Program. For this huge job only the best in snow removal equipment will do.

Write us today for full information on Frink Sno-Plows . . . all kinds for all jobs.

CARL H. FRINK, MFR., Clayton, 1000 Isl., N.Y.
DAVENPORT-BESLER CORP., DAVENPORT, IOWA
FRINK SNO-PLOWS OF CAN., LTD., TORONTO, ONT.

MORE TONS PER HOUR



MORE ACCURATELY ROLLED BY

3-AXLE TANDEMS

THE BUFFALO-SPRINGFIELD ROLLER CO.
SPRINGFIELD, OHIO

Directory of EQUIPMENT DISTRIBUTORS

The following cards (arranged by states) show the names of dealers in contractors' equipment and supplies, with a record of various lines handled.

GARLINGHOUSE BROS.

2416 E. 16th St. Los Angeles, Calif.

Southern California Distributors for

BROWNING—Truck Cranes, Shovels, Locomotive Cranes
DEMPSTER—Dumpsters
DIAMOND IRON WORKS—Crushers, Portable Gravel Plants
DAVEY—Compressors
LAMBERT-NATIONAL—Hoists and Cableways
McKIERNAN-TERRY CORP.—Pile Hammers
A. LESCHEN & SONS—Wire Rope
NOVO—Engines, Pumps, etc.
OMAHA—Dragline Buckets
OWEN—Clamshell Buckets
RANSOME—Concrete Mixers, Pavers, etc.
UNIVERSAL—Panel Forms, Form Clamps, etc.

Manufacturers of

GAR-BRO—Concrete Carts, Wheelbarrows, Concrete Hoppers, Buckets, etc.
GAR-BRO—Dragveyor Attachment for Draglines

EDWARD R. BACON CO.

Folsom at 17th St.
San Francisco, Calif.

Asroil Emulsion Distrs.
Allis-Chalmers Tractors
American Concrete Grinders
"Berg" Concrete Surfacers
Brooks Load Luggers
Byers Shovels, Cranes
Carlson Bit Grinders
Cleveland Trenchers
Dobbie Derricks, Fittings
Erie Rollers
Gar-Bro Barrows, Carts
Hercules Chip Spreaders
Hercules Power Units
Hough Sweepers
Huber Rollers
Interstate Tramways
Jackson Concrete Vibrators
Jaeger Mixers, Pumps, Hoists, Paving Equip.
Jones Saw Benches
Kiesler Clamshell Buckets
Kohler Lighting Plants
Littleford Wheeled Rollers
McKiernan-Terry Pile Hammers
Marion Shovels, Cranes, Draglines
Nelson Bucket Loaders
Ohio Locomotive Cranes
Page Dragline Buckets
Porta Conveyors
Ramsey Winches
Rogers Bros. Trailers
Schramm Air Compressors
Symons Cone Crushers, Vibrating Screens
"Thor" Air Tools
Toledo Torches
Ward Plows
Winslow Scales

Member: Associated Equipment Distributors

NORRIS K. DAVIS, INC.

400 Seventh St. San Francisco, Calif.

Representing

DAVIS COMPANY—Large Tilting Mixers, 1, 2, 3, and 4-yd., Weigh Batchers, Batching Plants, Manual or Full Automatic Operation, Readymix Concrete Plants and Equipment, Motor Truck Concrete Mixers and Carriers, Electrically Operated and Controlled Water Meters, Bins, Hoppers, etc.
W. E. GRACE MFG. CO.—Road Sweepers.
HANSON CLUTCH & MACHY. CO.—Full Revolving Shovels, Cranes, Draglines, ⅜, ½, ⅝, and ¾-yd.
LE ROI CO.—Gasoline Power Units and Parts
MINN. STL. & MACHY. CO.—Twin City Engines, parts
NORTHERN CONVEYOR CO.—Stationary & Portable Conveyor Units
O. K. CLUTCH & MACHY. CO.—Hoists & Compressors
SNOW REMOVAL EQ. CO.—Rotoblade & Sierra Snow Plows
THE EARL WALKER CO. INC.—Rd. Oilers, Walker Bars

LLEWELLYN MACHY. CORP.

1030 N. Miami Ave., Miami, Florida

Allied Companies
Atlas Imp. Diesel Eng. Co.
Austin-Western Rd. Machy. Co.
Barber-Greene Co.
Blystone Mfg. Co.
Browning Mfg. Co., Inc.
Century Electric Co.
Climax Engrg. Co.
Comm'l Shearing & Stamping Co.
Cooper Mfg. Co.
Crocker-Wheeler Elec. Mfg. Co.
Henry Disston & Sons, Inc.
Dodge Mfg. Corp.
Farm & Home Machy. Co.
Goulds Pumps, Inc.
W. W. Grainger, Inc.
Independent Pneu. Tool Co.
Ingersoll-Rand Co.
Jaeger Machine Co.
Edw. E. Johnson, Inc.
LeRoi Co.
Link-Belt Co.
Littleford Bros.
Marshalltown Mfg. Co.
Morse Chain Co.
F. E. Myers & Bros. Co.
Northwest Engrg. Co.
Novelty Steam Boiler Wks.
Novo Engine Co.
Ohio Pattern Wks. & Fdy. Co.
Owen Bucket Co.
Page Engrg. Co.
Permutit Co.
Roberts Filter Mfg. Co.
Saugen Derrick Co.
A. P. Smith Mfg. Co.
Square D Co.
Stearns Mfg. Co.
Stover Mfg. & Engine Co.
Viking Pump Co.
Wall Rope Works, Inc.
Whitehead Bros. Rubber Co.
Wickwire Spencer St. Corp.
Wisconsin Motor Co.
Yale & Towne Mfg. Co.
Yates-American Machine Co.

McCLUNG-LOGAN EQUIPMENT CO., INC.

Key Highway & McComas St., Baltimore, Md.

Sales—Service—Rentals

Acme (Lancaster)—Material Bins, Batchers
Allis-Chalmers—Tractors, Graders, Power Units
Baker—Scrapers, Bulldozers, Trailbuilders, Snow Plows
Buckeye—Finegraders, Spreaders, Ditchers, Backfillers, Shovels, Cranes
C. H. & E.—Saw Rigs
Chain Belt (Rex)—Mixers, Pavers, Pumps, Pumpcrete
Chicago Pneumatic—Compressors, Drills, Breakers, Pneumatic and Electric Tools
Euclid—Wagons, Bulldozers
Haiss—Loaders, Conveyors, Buckets
Hough—Shovels
Iowa—Quarry Sand & Gravel Equipment, Black Top Plants
Jones & Laughlin—Gilmore Wire Rope
Keystone—Skimmers, Backhoes, Shovels, Cranes
Northwest—Shovels, Cranes, Draglines
Wiley—Whirleys, Steel Barges, Conc. Buckets, etc.
Gar Wood—Scrapers, Bulldozers, Gradebuilders, Rollers

Curing Materials, Hunt Process Ritecure

WE WOULD LIKE TO HAVE YOU HELP US

keep this Directory of Dealers in construction equipment up to date. Therefore, we would greatly appreciate any suggestions or corrections that you may have to offer.

CONTRACTORS AND ENGINEERS MONTHLY

470 Fourth Ave. New York

YANCEY BROTHERS, INC.

634 Whitehall St., S. W.
Atlanta, Ga.

American Manganese Jaws
American Cable Wire Rope
Barber-Greene Ditchers, Conveyors, Asphalt Equipment
Barnes Pumps
Buffalo-Springfield Rollers
"Caterpillar" Tractors, Graders, Power Units, etc.
Cedar Rapids Crushers
Clyde Hoists
Connery Kettles, Tools
Dempster Quarry Skips
Durex Saw Rigs
Ingersoll-Rand Air Compressors, Air Tools
Jackson Vibrators
Johnson Bins, Batchers, Bulk Cement Plants
Killefer Rippers, Harrows, Drag Scrapers, Plows
Kinney Asphalt Distributors
LaPlant-Choate Bulldozers, Trailbuilders, Tamping Rollers
LeTourneau Carry-all Scrapers, Angledozers, Rippers
Metaform Road, Sidewalk, Curb & Gutter Forms
Page Dragline Buckets
Red Edge Shovels
Red Star Wheelbarrows, Concrete Carts
Rex Mixers, Pumps, Pavers
Russell Road Plows
Thew-Lorain Shovels
Timken Drill Bits & Rods
Ward Road Plows
"Williams" Buckets

Member: Associated Equipment Distributors

F. H. BURLEW COMPANY

3401 South Hoyne Ave., Chicago, Ill.
Telephone: VIrginia 1100

BATES Wire Ties, etc.
BYERS Crawler Cranes, Shovels, Draglines
BEEBE BROS. Hoists
CHAIN BELT Mixers, Pavers, Pumps, Elevators, Pumpcrete, Mixto Mixers
ERIE Steel Bins, Batchers, Aggremeter Plants
M & M Form Clamps
MEYER-HECHT Adjustable Shores
NORDBERG Track Shifters and Tunnel Shovels
SAUGEN Derricks
SCHRAMM Air Compressors, Tools
Winslow Whlh. Scales

McKiernan-Terry Corp. (Divisions)

McKIERNAN-TERRY—Pile Hammers, Extractors
LAMBERT-NATIONAL—Hoists, Cableways
STEELE & CONDICT—Special Machinery

Wheelbarrows, Hose, Cable Rope, Tarpaulins, etc., carried in stock

Member: Associated Equipment Distributors

O. T. CHRISTERSON CO.

3900 So. Wabash Ave. Chicago, Ill.

Representing

BLAW-KNOX—Road Forms, Bins, Batchers, Finishing Machines, Buckets, Truck Mixers, Spreaders, Vibrators
C. H. & E.—Road Pumps, Saw Rigs, 2-Ton Rollers
CHICAGO PNEUMATIC TOOL CO.—Compressors, Air Tools, Hose
CLEVELAND—Subgraders, Straight Edges, Finishing Tools
GORMAN-RUPP—Self Priming Centrifugal Pumps, Road Pumps
INSLEY MFG. CO.—Cranes, Shovels, Wagons, Conc. Carts, Derricks, Concrete Buckets
KOEHRING—Mixers, Pavers, Cranes, Shovels, Dumptors, Mud Jacks, Trail Dumps, Wheelers, Longitudinal Finisher
KWIK-MIX—Concrete and Bituminous Mixers
PARSONS—Trench Machines, Backfillers, Turbo Mixers

Concrete Carts, Wheelbarrows, Supplies

PEORIA TRACTOR & EQUIPMENT CO.

400 Franklin Street Peoria, Illinois

Representing

Athey Truss Wheel Co.
Caterpillar Tractor Co.
Killefer Mfg. Corp.
LaPlant-Choate Mfg. Co.
R. G. LeTourneau, Inc.
Thew Shovel Co.
Trackson Co.
Willamette Hyster Co.
Universal Crusher Company

Telephone 6177

INDIANA EQUIP. CO., INC.

327-329 West Market St., Indianapolis, Ind.

Representing

ATHEY TRUSS—Wagons, Bulldozers
BUFFALO-SPRINGFIELD—Rollers
"CATERPILLAR"—Road Machinery
"CATERPILLAR"—Tractors
CHAIN BELT CO.—Mixers, Pumps
DIAMOND—Crushers, Screens
GARDNER-DENVER—Compressors, Tools
LaPLANT-CHOATE—Wagons, Scrapers, Bulldozers
LE TOURNEAU—Scrapers, Buggies, Bulldozers
OWEN—Clamshell Buckets
PAGE—Dragline Buckets
SAUERMAN—Cableways, Power Scrapers
UNIVERSAL—Crushers, Pulverizers
THEW—Shovels, Draglines
TYLER-NIAGARA—Vibrating Screens

Member: Associated Equipment Distributors

GIERKE-ROBINSON CO.

4th & Ripley Sts. Davenport, Iowa

Representing

BARCO—Gasoline Hammers
BLAW-KNOX—Steel Road, Curb and Gutter Forms, Bins, Batchers, Clamshell Buckets, Truck Turntables, Ord Concrete Road Finishers
CHAIN BELT—Mixers, Pavers, Pumps, Elevators
CLYDE—Gasoline and Steam Hoists, Derricks
LITTLEFORD—Heaters, Kettles, Bituminous Distributors
MASTER—Vibrators, Generators, Arc Welders
SULLIVAN—Air Compressors, Tools
TRACKSON—Crawlers, Shovels and Bulldozers
THEW-LORAIN—Cranes, Shovels, Draglines
TIMKEN—Detachable Rock Bits, Steels
UNIVERSAL—Truck Cranes
UNIVERSAL—Form Clamps

Member: Associated Equipment Distributors

FLETCHER EQUIP. CO., INC.

309 Magazine Street New Orleans, La.

American Mfg. Co.
Bethlehem Steel Co.
Bates Valve Bag Corp.
Clyde Iron Works, Inc.
Dempster Bros., Inc.
Diamond Iron Works
Gardner-Denver Co.
The Gorman-Rupp Co.
Insley Mfg. Co.
The Jaeger Machine Co.
Jones Superior Machine Co.
C. S. Johnson Co.
Koehring Co.
Kwik-Mix Mixer Co.
Littleford Bros.
M & M Wire Clamp Co.
Mall Tool Co.
Owen Bucket Co.
Parsons Co.
Page Engineering Co.
Jos. G. Pollard Co.
Saugen Derrick Co.
Sauerman Bros., Inc.
Sterling Wheelbarrow Co.
Toledo Pressed Steel Co.
Tompleton, Kenly & Co., Inc.
Universal Form Clamp Co.
Van Dorn Iron Works Co.
Wood Shovel & Tool Co.

Member: Associated Equipment Distributors

ALBAN TRACTOR CO., INC.

725-27 East 25th St. Baltimore, Md.

Representing

CATERPILLAR TRACTORS AND ROAD MACHINERY

ATHEY TRUSS WHEEL CO.
BLAW-KNOX CO.
BUCKEYE TRACTION DITCHER CO.
JOHN DEERE Industrial and Agricultural Equipment
GARDNER-DENVER CO.
GENERAL EXCAVATOR CO.
HERCULES ROLLER CO.
"INVADER" SHOVELS
KILLEFER MFG. CORP.
LaPLANT-CHOATE MFG. CO.
OSGOOD CO. Shovels, Cranes, Draglines
PIONEER ENGR. WKS., INC.
R. G. LeTOURNEAU, INC.
ROGERS BROS. CO.
WILLAMETTE HYSTER CO.
WM. BROS BOILER MFG. CO.

CATERPILLAR DIESEL AND GAS POWER UNITS

D. C. ELPHINSTONE, INC.

115 S. Calvert St. Baltimore, Md.
976 Nat'l Press Bldg., Washington, D. C.

Representing

E. D. Etnyre & Co.
Electric Tamper & Equip. Co.
Emerson Pump & Valve Co.
Goodall Rubber Co.
Gorman-Rupp Company
Hauck Mfg. Co.
H. K. Porter Co.
Hough-Universal Sweepers
Huber Mfg. Co.
Insley Mfg. Co.
C. S. Johnson Co.
Koehring Co.
Kwik-Mix Co.
LaBour Co., Inc.
Lambert-National Hoists
Linn Mfg. Corp.
McKiernan-Terry Corp.
Minwax Co.
Owen Bucket Co.
Parsons Co.
Reed-Prentice Corp.
Sauerman Bros. Inc.
Syntron Co.
Truscon Steel Co.
Worthington Pump & Machy. Corp.

Member: Associated Equipment Distributors

JOHN C. LOUIS COMPANY

511 W. Pratt St.
Baltimore, Md.

Representing

AMERICAN CABLE—Truflay Wire Rope
BUTLER—Bins
CENTAUR—Road Mowers
GALION—Leaning Wheel Graders
GENERAL—Wheelbarrows
GOOD ROADS—Crushers
JAEGER—Concrete Mixers, Pumps, Truck Mixers, etc.
JONES—Saw Rigs
LAKEWOOD—Finishers, Forms, Towers
LITTLEFORD—Asphalt Heater, Distributors
MALL—Conc. Vibrators
TIMKEN—Detachable Rock Bits
WHEELING—Corrugated Culvert Pipe

Member: Associated Equipment Distributors

THE HENRY H. MEYER CO., INC.

110 S. Howard St., Baltimore, Md.
1133 13th St., N.W., Washington, D.C.

Representing

Barber-Greene Co.
Bay City Shovels, Inc.
Blaw-Knox Co.
Boston & Lockport Bl. Co.
Columbus Conveyor Co.
Connery & Co., Inc.
Debbie Fdry. & Mach. Co.
Domestic Eng. & Pump Co.
Duff-Norton Mfg. Co.
Harrington Co.
Ingersoll-Rand Co.
Johns-Manville
A. Leschen & Sons Rope Co.
Lidgerwood Mfg. Co.
Lima Locomotive Works
Master Vibrator Co.
Novo Engine Co.
Pierce Equip. Co.
Pulsometer Steam Pump Co.
Richmond Screw Anchor Co.
Sterling Wheelbarrow Co.
Tompleton, Kenly & Co.
Union Iron Works, Inc.
Universal Road Machy. Co.

Member: Associated Equipment Distributors

INDIANA EQUIP. CO., INC.

327-329 West Market St., Indianapolis, Ind.

Representing

ATHEY TRUSS—Wagons, Bulldozers
BUFFALO-SPRINGFIELD—Rollers
"CATERPILLAR"—Road Machinery
"CATERPILLAR"—Tractors
CHAIN BELT CO.—Mixers, Pumps
DIAMOND—Crushers, Screens
GARDNER-DENVER—Compressors, Tools
LaPLANT-CHOATE—Wagons, Scrapers, Bulldozers
LE TOURNEAU—Scrapers, Buggies, Bulldozers
OWEN—Clamshell Buckets
PAGE—Dragline Buckets
SAUERMAN—Cableways, Power Scrapers
UNIVERSAL—Crushers, Pulverizers
THEW—Shovels, Draglines
TYLER-NIAGARA—Vibrating Screens

Member: Associated Equipment Distributors

CLARK-WILCOX COMPANY

790-798 Albany St. Boston, Mass.

Representing

ALLIS-CHALMERS—Tractors
ATLAS—Powder, Blasting Equipment
BAKER—Bulldozers
BEEBE BROS.—Hoists
BLYSTONE—Mortar Mixers
BURCH—Rose Plows, Road Machinery
CLEVELAND—Formgraders
C. R. JAHN CO.—Trailers
GARDNER-DENVER—Air Compressors
HAISS—Elevators, Conveyors and Loaders
HAUCK—Oil Burners and Heaters
HAZARD—Wire Rope, Cable
HELTZEL—Bins and Forms
HOMESTEAD—Hypressure Jenny Cleaner
MARLOW—Self-Priming Pumps
NORTHWEST—Cranes, Shovels, Draglines
PIERCE—Rollers
PIONEER—Crushers, Gravel Plants
RANSOME—Concrete Mixers, Chuting Equip.
GAR WOOD—Scrapers, Sheepsfoot Rollers

Member: Associated Equipment Distributors

HEDGE & MATTHEIS CO.

285 DORCHESTER AVE. BOSTON, MASS.

Boston, Springfield, Worcester, Mass.; Portland, Bangor, Me.; Hartford, New Haven, Conn.; Concord, N. H.; Bellows Falls, Vt.; Providence, R. I.

Asroil Burner Co., Inc.
Bureh Corp.
Byers Machine Co.
Concrete Surfacing Machy. Co.
Electric Tamper & Eq. Co.
Four-Wheel Drive Auto Co.
Frink, Carl H.
Hercules Motors Corp.
Huber Mfg. Co.
Ingersoll-Rand Co.
Jaeger Machine Co.
Jones Superior Machine Co.
A. Leschen & Sons Rope Co.
Linn Manufacturing Corp.
McKiernan-Terry Corp., and Lambert-Nat'l Hoist Div.
N. P. Nelson Iron Wks., Inc.
Owen Bucket Co.
Page Engineering Co.
Red Star Products Co.
Rogers Bros. Corp.
Rome Grader & Machinery Corp.
Saugen Derrick Co.
Sauerman Bros. Inc.
Syntron Co.
Toledo Pressed Steel Co.
Universal Crusher Co.
Universal Form Clamp Co.
Wood Shovel & Tool Co.

Member: Associated Equipment Distributors

THORMAN W. ROSHOLT CO.

3138 Snelling Ave. Minneapolis, Minn.

Representing

ADAMS Power Grader
BAILY Concrete Vibrator
BARCO Hammers
BEACH Saws
"BERG" Concrete Surfacer
BUCYRUS-ERIE Scrapers and Bulldozers
BUFFALO-SPRINGFIELD Rollers
CHICAGO PNEUMATIC Compressors and Tools
CLEAVER-BROOKS Bellers
CORRUGATED Steel Sheet Piling
GORMAN-RUPP Pumps
INSLEY Shovels & Cranes
INTERNATIONAL Indus. Tractors
IOWA "Cedar Rapids" Crusher Plants and Equip.
JOHNSON Batchers and Demountable Bins
KWIK-MIX Mixers
KOEHRING Pavers, Mixers, Cranes, Dumpster, Mud-Jacks, Shovels
LIDGERWOOD Hoists
METAL FORMS CORP.
MURPHY Diesels
OWEN Buckets
RAMSEY Hoists, Winches
ROSCO Trailers and Bituminous Distributors
SARGENT Snow Plows
"SNOGO" Rotary Snow Plow
SUPERIOR Form Clamps
TRACKSON Loaders and Cranes
UNION IRON WORKS
VULCAN Steam and Gas Locomotives

Member: Associated Equipment Distributors

WM. H. ZIEGLER CO., INC.

Minneapolis, St. Paul, Duluth, Crookston, Minn.

ATHEY—Crawlers, Dump Wagons, Trailers
BARBER-GREENE—Conveyors, Loaders, Ditchers
BUCYRUS-ERIE—Power Shovels, Cranes, Draglines
BUTLER—Bins, Batchers
"CATERPILLAR"—Tractors, Engines, Road Machinery
DAVENPORT-BESLER—Locomotives, Snow Plows
FOUR WHEEL DRIVE AUTO CO.—Trucks
FRINK—Snow Plows
GARDNER-DENVER—Air Compressors, Drills
HOMESTEAD—Hypressure Jenny Spray Cleaners
KILLEFER—Road Rippers, Scrapers
LaPLANT-CHOATE—Bulldozers, Snow Plows, Dump Wagons
LESCHEN—Wire Rope
LeTOURNEAU—Dirt Moving Equipment
LITTLEFORD—Oil Distributors, Tar Kettles, Heaters
MADSEN—Asphalt Plants
PIONEER—Crushers, Gravel Plants
REX—Mixers, Pavers, Mixto-Mixers, Pumps
"WILLIAMS"—Buckets

Member: Associated Equipment Distributors

BUBLITZ MACHINERY CO.

2305 Pennway, Kansas City, Mo.

Representing

Austin-Western Rd. Mashy. Co.
Bethlehem Steel Co. (Williamsport Div.)
Butler Bin Co.
Cleveland Rock Drill Co.
Cleveland Tractor Co.
Electric Tamper & Equipment Co.
Jaeger Machine Co.
Lakewood Engineering Co.
LaRoi Co.—Air Compressors
McKiernan-Terry Corp.
Red Star Products Co.
Saugen Derrick Co.
Thew Shovel Co.
Union Fork & Hoe Co.
Whitcomb Locomotive Co.
"Williams"—Buckets and Trailers
Wm. Bros Boiler & Mfg. Co.

Member: Associated Equipment Distributors

O. B. AVERY COMPANY

1325 Macklind Avenue St. Louis, Mo.

Exclusive Distributors of

AMERICAN Hoists & Derricks
AUSTIN Trenchers
AUSTIN-WESTERN Graders, Rollers, Sweepers, Scrapers
BLAW-KNOX Bins, Buckets, Finishers, Forms
BRODERICK & BASCOM Wire Rope
BURCH Spreaders, Snow Plows
CEDAR RAPIDS Crushers
CHAIN BELT Mixers, Pavers, Pumps
CLEVELAND Air Tools
DEMPSTER Dumpsters
KEWANEE Conveyors
LITTLEFORD Distributors, Tar Kettles
MASTER Vibrators, Generators
McKIERNAN-TERRY Pile Hammers
NORTHWEST Shovels, Cranes & Draglines
PIERCE Rollers
R-B Subgraders
SARCO Hammers
VULCAN Locomotives
SCHRAMM Compressors

Member: Associated Equipment Distributors

CORBY SUPPLY COMPANY

3942-46 W. Pine Blvd., St. Louis, Mo.

Representing

AMERICAN—Flexible Metal Hose
BUHL CO.—Portable Air Compressors
CHAMPION RIVET CO.—Rivets and Welding Rod
DETROIT HOIST & MACH. CO.—Air and Electric Hoists
DeVILBISS CO.—Paint Spray Equipment
HARDSOCG WONDER DRILL CO.—Rock Drills and Paving Breakers
WM. H. KELLER, INC.—Super Pneumatic Tools
MUNSELL—Air-Operated Concrete Vibrators
PANGBORN CORP.—Sandblast Equipment
PENNSYLVANIA—Air Compressors and Pumps
DAVID ROUND & SON—Chain Hoists
STAYNEW—Air and Pipeline Filters
N. A. STRAND & CO.—Flexible Shaft Equipment
VAN DORN—Electric Drills, Grinders and Buffers
VICTOR—Welding and Cutting Apparatus
WESTINGHOUSE—Arc Welding Equipment
GUSTAV WIEDEKE CO.—Tube Expanders

JOSEPH KESL RENTAL EQUIPMENT CO.

430 Withers Ave., St. Louis, Mo.

(We rent construction equipment of all kinds)

Air Compressors
Blade Graders
Bulldozers, Backfillers
Concrete Mixers
Crawler Wagons, Tractors
Elevating Graders
Hoists
Hydraulic Scrapers
Motor Graders
Pumps
Rock Crushers
Rollers
Rotary Scrapers
Sand, Gravel Eq.
Shovels and Draglines
Wheel Tractors

Member: Associated Equipment Distributors

C. F. RABBEITT, INC.

1523 N. Broadway
St. Louis, Mo.

Representing

Baily Vibrator Co.
Cleveland Formgrader Co.
Cleaver-Brooks Co.
Concrete Surfacing Machy. Co.
Drave-Doyle Co.
Fairbanks, Morse & Co.
Good Roads Machinery Corp.
Heltzel Steel Form & Iron Co.
Frank G. Hough Co.
Huber Mfg. Co.
Insley Mfg. Co.
Koehring Co.
Kwik-Mix Concrete Mixer Co.
Lidgerwood Mfg. Co.
Northern Conveyor Co.
Parsons Co.
Rose Mfg. Co.
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Sterling Wheelbarrow Co.

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Davey—Compressors
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Hauck—Heaters
Kelley—Power Floats
LeRoi—Engines
Loschen—Rope
Link-Belt Speed-o-Matic Shovels, Cranes, Draglines
Mall—Vibrators, Grinders, Saws, Drills
Novo—Pumps
Owen—Clamshell Buckets
Ramsey—Winches
Red Star—Wheelbarrows, Carts, Shores
Rodgers—Hydraulic Presses
Saugen—Derricks & Winches
Schen—Salamanders
Skelton—Shovels
T. L. Smith—Mixers, Truckmixers
Symons—Column Clamps
Tompleton, Kenly & Co.—Trench Braces, Jacks
Universal—Form Clamps
Vail—Tie Wires and Tools
Vulcan—Hammers
Waukesha—Engines
Whiteman—Concrete Surfacers
Winslow—Weighing Scales

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Sale *Rent*

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Diaphragm Pumps	
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Rubber Hose and Boots	Cement Waterproofing
Manila and Wire Rope	Galvanized Rods and Bolts
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Screw Jacks	Iron and Wood Blocks
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ALEMITE Guns and Fittings
CHAMPION Sewer Cleaning Machines
HELTZEL Road Forms and Bins
INGERSOLL-RAND Compressors and Tools
JACKSON Wheelbarrows
REX Mixers and Pavers
REX Pumps
UNIVERSAL Concrete Accessories
VIBER Elec. & Pneu. Concrete Vibrators
WALKER-TURNER Radial Saws
WALSH Snow Plows
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JOHNSON & DEALAMAN, INC.

255 South Street Newark, N. J.

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American Snow Plows, Hoists, Derricks, Sheaves
American Cable Truley & Crescent Wire Rope
Baker Bulldozers, Gradebuilders, Scrapers, Rd. Equip.
Brooks Load-Loggers
C. H. & E. Saw Tables & Hoists
Cleveland Paving Breakers, Pneumatic Tools
Far-Wood—Continental Scrapers, Bulldozers, Rd. Equip.
Hauck Concrete & Water Heaters, Oil Burning Equip.
Hotchkiss Road, Sidewalk & Concrete Forms
Hough Hydraulic Loaders, Sweepers & Allied Tractor Attachments
Jackson Wheelbarrows, Conc. Carts, Salamanders, etc.
Johnson Steel Bins, Batchers, Scales
La Crosse Trailers
Marlow Centrifugal, Diaphragm & Plunger Pumps
Master Concrete Vibrators
Nelson Bucket & Snow Loaders
P & H Shovels, Cranes
Ransome Pavers, Mixers, Truck Mixers, Conc. Carts, Chuting Equipment
Red Star Wheelbarrows, Batch Boxes, Conc. Carts, Column Clamps & Adjustable Shores
Schramm Air Compressors
Shovels, Cranes, Trailers, Rollers, etc.

Member: Associated Equipment Distributors

WE WOULD LIKE TO HAVE YOU HELP US

keep this Directory of Dealers in construction equipment up to date. Therefore, we would greatly appreciate any suggestions or corrections that you may have to offer.

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Representing

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Burch Spreaders
Coleman Trucks
General Excavator Co.
Hercules Roller Co.
Quick-Way Truck Shovels
Ross Snow Plows
Smith Mixers

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EUGENE F. VAN NAME

116 John Street Horseheads, N. Y.

Representing

AEROIL—Burners
ALLIS-CHALMERS—Tractors, Graders
ARMCO—Culverts
A-W—Traffic Tread
BAILY—Vibrators
BAKER—Road Drags, Snow Plows, Bulldozers
C.M.C.—Wender & Marsh-Capron Mixers
DIAMOND—Crushers, Conveyors, Screening & Washing Equip.
HOTCHKISS—Sidewalk Forms
HUBER—Rollers
HY-LO Oil-Burning Salamanders
JACKSON—Wheelbarrows
LANSING—Wheelbarrows
MILES—Concrete Block Machines
ROWE—Can't Drift Snow Fence
SWEET'S—Steel Posts
THEW-LORAIN—Shovels, Cranes
UNIVERSAL-LORAIN—Shovels, Trailers
WILLIAMSPORT—Wire Rope
WISCONSIN SPECIAL—Snow Plows
WORTHINGTON—Compressors

COMPLETE MACHINERY & EQUIPMENT CO., Inc.

"Specialists in Pumps"

36-40 Eleventh St.
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Representing

COMPLETE—Wellpoint Systems
INGERSOLL-RAND CO.—Air Compressors
KADCO CORP.—Dust Control Equipment
McKIERNAN-TERRY CORP.—Pile Hammers
MALL TOOL CO.—Concrete Vibrators
MARLOW—Self-priming Centrifugal & Plunger Pumps

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New Hyde Park, N. Y.

Long Island Distributors:

ADAMS Graders	LOCKE Power Mowers
BRODERICK & BASCOM Wire Rope	OLIVER Implements
CLETRAC Crawler Tractors	
EUCLID Scrapers	SARGENT Snow Plows
LITTLEFORD Tar Kettles, Heaters, Distributors, etc.	"SILVER KING" Tractors

WORTHINGTON Power Mowers
Also Pumps, Mixers

R. E. BROOKS COMPANY

"Serving the Contractor for over 28 years"

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Cleaver-Brooks Co.—Tank Car Heaters, Bousters
Cleveland Tractor Co.—Cletrac Tractors
Gorman-Rupp Co.—Pumps
Insley Mfg. Co.—Excavators, Concrete Chuting Plants, Buckets, Cars
Koehring Co.—Pavers, Mixers, Shovels, Cranes, Mud Jacks, Wheelers, Dumptors, Longitudinal Finishers
Kwik-Mix Mfg. Co.—Concr. Mixers
Parsons Co.—Trench Machines
Pioneer Engrg. Wks., Inc.—Sand & Gravel Plants
Rosco Mfg. Co.—Oil Distributors

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KEYSTONE Grease
LINCOLN Grease Guns
TOLEDO Bull Frog Wheelbarrows
WYOMING Red Edge Shovels
YALE Hoists
Also Blasting Mats

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1162 Grinnell Place New York, N.Y.

Phone: DAyton 9-5300

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BAKER Bulldozers, Gradebuilders, Snow Plows
BARNES Diaphragm and Self-Priming Pumps
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EASTMAN Hi-Pressure Hydraulic Hose
GARDNER-DENVER Compressors and Rock Drills
HAISS Clamshell Buckets
HOUGH Hydraulic Shovel Loaders
JAHN Heavy-Duty Trailers
MURPHY-DIESEL Engines, Power Units
NORTHWEST Shovels, Cranes, Draglines
PAGE Dragline Buckets
R-B Finegraders
TIMKEN Rock Bits
GAR WOOD Scrapers, Rip Rooters, Bulldozers

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HOISTING MACHINERY CO.

Warehouse

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157th St. & Sedgwick Ave., New York, N. Y.

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EUCLID Trucks, Crawler Wagons, Tamping Rollers
KNICKERBOCKER Concrete and Mortar Mixers
LIMA Shovels, Cranes, Draglines, 1 yd. to 2½-yd. capacity
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ROGERS Heavy-Duty Trailers
THEW Shovels, Cranes, Backhoes, ¾-¾-yd. capacity.
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WILLIAMS Clamshell and Dragline Buckets
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Complete Line of Contractors' Equipment and Supplies

217 Pearl Street New York, N. Y.

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Hotchkiss Road & Sidewalk Forms
Ingersoll-Rand Compressors, Drills, Pneu. Tools, etc.
Kardong Bar Benders
Lansing Concrete, Mortar Mixers, Wheelbarrows & Carts
Master Gas & Elec. Conc. Vibrators
Onan and Master Gasoline Engine-Driven Generators
Richmond Tyecrus, Anchors
Sterling Pumps of all descriptions
Tuthill Hwy. Guard Rail, Hwy. Divider
Vulcan Pile Hammers, Extractors, Parts
Wiley Concrete Buckets
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Member: Associated Equipment Distributors

H. O. PENN MACHY. CO., INC.

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ATHEY TRUSS WHEEL CO.	HELTZEL Steel Bins, Forms
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BUCYRUS - ERIE Shovels, Cranes	LaPLANT-CHOATE MFG. CO.
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DEERE Indus. Tractors	MARLOW Pumps
FOOTE Pavers	OWEN Buckets
FRINK Sno Plows	R. G. LeTOURNEAU, INC.
	SMITH Mixers

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NEW YORK, N.Y.

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Gorman-Rupp Co.	Universal Form Clamp Co.
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Elgin Corporation	Jeffrey Manufacturing Co.
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Fairfield Engrs. Co.	Municipal Supply Co.
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THE CLEVELAND TRACTOR CO.—Crawler Tractors, Front End Loaders
THE HEIL CO.—Power Scrapers, Bulldozers & Trailbuilders
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3088 West 106th St., Cleveland, Ohio Tel. Orchard 4400

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Brooks—Load Loggers	R-B Equipment Co.—Finegraders
Buskeye—Ditchers	Rosco Mfg. Co.—Distributors & Oilers
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On Route 40

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Colling Hoist Co.	Sauerman Brothers, Inc.
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Handlan Inc.	Sullivan Machinery Co.
Huber Mfg. Co.	Templeton Kenly & Co., Inc.
Klauer Mfg. Co.	Toledo Pressed Steel Co.
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Athey Truss Wheel Co.—Crawler Wagons
Barnes Mfg. Co.—Centrifugal Diaphragm and Force Pumps
Blaw-Knox Co.—Clamshell Buckets, Road Forms, Material and Cement Bins
"Caterpillar"—Tractors and Road Machinery
Davey—Air Compressors
R. G. LeTourneau, Inc.—Carryalls, Buggies
LaPlant-Choate Mfg. Co. — Bulldozers, Trailbuilders, Carryalls, etc.
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Northwest Engineering Co.—Gasoline Cranes, Shovels and Draglines
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Butler Bin Co.	Plymouth Locomotive Works
Chain Belt Co.	
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Buckeye—Shovels, Cranes, Ditchers, Spreaders	Miles Block Machines
CMC Master Mixers, Saw Rigs	Multi Foote Pavers
	New Haven Burlapped-Cotton Blankets
CMC Self-Priming Pumps	Pulsometer Steam Pumps
Dempster—Dumpsters	R-B Finegrader
Flex-Plane Finishing Machine	Sasgen Derricks, etc.
Hayward Clamshell Buckets	Sullivan Portable Air Comp.
Heltzel Finishing Mach.	Tru-lay Steel Cable
Heltzel Steel Forms, Bins	Union Pile Hammers
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CONTRACTORS AND ENGINEERS MONTHLY

470 Fourth Ave. New York

New Marion President

The election of D. J. Shelton to the offices of President and General Manager has been announced by the Marion Steam Shovel Co. of Marion, Ohio. Mr. Shelton, who has been with the company for 32 years and recently has been Vice President, succeeds J. H. Watters who resigned to accept the presidency of the Union Asbestos & Rubber Co. of Chicago.

Alex Gibson, Treasurer of the company, was elected Vice President to succeed Mr. Shelton as well as serving as Treasurer. John P. Courtright has been placed in full charge of sales for the company.

ROGERS builds trailers of every type of a design that has been thoroughly proved under every conceivable condition of difficult service.

Scientific design, based upon long experience, alloy steel and electric welding produce trailers that have an envious record for long service with remarkable freedom from repairs. Get the NEW catalog.

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EXPERIENCE *builds'em* PERFORMANCE *sells'em*

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W. F. Hebard & Co.—Shop Mules
Hercules Company—Road Rollers
Internat'l Harvester Co.—Indus. Wheeltype and Crawler Tractors
Jaeger Machine Co.—Mixers, Truck Mixers, Pumps, Black Top Pavers, Finishing Machines
C. S. Johnson & Co.—Bins, Batchers, Cement Handl. Eq.
Lambert-National—Hoists
Littleford Bros.—Road Oil Distrs. Heating Kettles, etc.
McKiernan-Terry Corp.—Pile Hammers
N. P. Nelson Iron Wks., Inc.—Leaders & Belt Conveyors
The Parsons Company—Trench Machines, Snow Plows
Pioneer Engineering Wks., Inc.—Roll Crushers
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Member: Associated Equipment Distributors

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Davenport Besler Corp.
Galion Iron Works & Mfg. Co.
Gardner-Denver Co.
Hug Co.
Iowa Mfg. Co.
Jaeger Machine Co.
Jeffrey Mfg. Co.
C. S. Johnson Co.
Northwest Engr. Co.
Owen Bucket Co.
Pomona Pump Co.
Skilsaw, Inc.
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LeRoi Co.
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Mall Tool Co.
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Sasgen Derrick Co.
Sheldon Mfg. Co.
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Sterling Wheelbarrow Co.
Sullivan Machinery Co.
Sunbeam Mfg. Co.
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Williamette Hyster Co.
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Bursh Corp.—Snow Plows, Maintainers
C. H. & E. Mfg. Co.—Saw Rigs, Rollers, Hoists
Clyde Iron Wks., Inc.—Gas, Elec., Steam Hoists
Concrete Surfacing Machinery Co.—Berg Surfacers
Electric Tamper & Equipment Co.—"Jackson" Vibrators
Essick Machy. Co.—Plaster Mixers
Gardner-Denver Co.—Air Compressors
Gilson Brothers Co.—Conc. Mixers
Huber Mfg. Co.—Road Rollers
Jay Mfg. Co.—Snow Loaders
Link-Belt Speed-o-Matic Shovels, Cranes, Draglines
Ransome Concrete Machy. Co.—Truck Mixers
Richmond Screw Anchor Co.—Form Ties
W. A. Riddell Corp.—Road Graders
John A. Roebling's Sons Co.—Wire Rope, Fittings
Sasgen Derrick Co.—Derricks and Winches
Shannon—Derricks and Derrick Fittings
Sterling Machy. Corp.—Pumps, Hoists, Generators
Van Dorn Iron Works Co.—Sweepers
Member: Associated Equipment Distributors

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Ames Baldwin Wyoming Co
Baker Mfg. Co.
Blaw-Knox Co.
Cleaver-Brooks Co.
Clyde Iron Works, Inc.
E. D. Etnyre Co., Inc.
Gorman-Rupp Co.
Ingersoll-Rand Co.
Insley Mfg. Co.
Koehring Co.
Littleford Bros.
Master Vibrator Co.
The Parsons Co.
Smith Engineering Works
Gar Wood Indus., Inc.
NASHVILLE—KNOXVILLE
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Reinforcing Steel and Mesh
Member: Associated Equipment Distributors

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Centaur Co.
Concrete Surfacing Machy. Co.
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Hauck Mfg. Company
Hercules St. Products Co.
Huber Mfg. Co.
Iowa Manufacturing Co.
Independent Pneumatic Tool Co.
Jaeger Machine Co.
C. S. Johnson Company
Jones-Superior Machine Co.
LeRoi Co.
A. Leschen & Sons Rope Co.
Lima Locomotive Works
McKiernan-Terry Corp.
N. P. Nelson Iron Wks., Inc.
Portable Machinery Company
Red Star Products, Inc.
Rogers Bros. Corp.
Sasgen Derrick Co.
Superior Concrete Accessories, Inc.
Union Fork & Hoe Co.
Union Metal Mfg. Co.
Walker-Turner Co., Inc.
Wellman Engineering Co.
Member: Associated Equipment Distributors

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CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York

BROWNING-FERRIS MACHY. CO.
205 Exposition Ave. Dallas, Texas
Texas at Rice Sts. Houston, Texas
Representing
Cleveland Trencher Co.
Foote Company—Pavers
Galion Iron Works & Mfg. Co.
Bucyrus-Erie—Scrapers, Bulldozers
Ingersoll-Rand Company
International—Tractors
Iowa Mfg. Co.—Cedar Rapids Line
Jaeger Machine Company
Jones Superior Mach. Co.
Littleford Brothers
The Owen Bucket Company
Page Engineering Co.
Sterling Wheelbarrow Co.
Thew Shovel Company
Traekson Company
Member: Associated Equipment Distributors

CUNNINGHAM-ORTMAYER CO.
429 W. Michigan St. Milwaukee, Wis.
Blaw-Knox Truck Mixers
Butler Bins, Batchers
C.H.&E. Pumps, Hoists, Saw Rigs
Case Tractors and Mowers
Cleveland Formgrader Paving Equipment
"Dowflake" Calcium Chloride
Eagle Crushers
Flexible Road Joint Machines
Flexible Sewer Cleaning Equipment
Galion Iron Graders, Rollers and Spreaders
Good Roads Snow Plows
Handlan 100-Hour Lantern, Torches
Heltzel Steel Road Forms
Ingersoll-Rand Air Compressors, Tools
Insley Power Shovels, Conc. Towers & Buckets
Koehring Conc. Mixers, Cranes, Shovels, etc.
Kwik-Mix Conc. Mixers
Littleford Distributors, Tar Kettles, Heaters
Multiplex Conc. Block Eq.
Omaha Dragline Buckets
Owen Clamshell Buckets, Grapples
Paasche Spray Painting Equip.
Parsons Trenchers
Reeth Conc. Vibrators
Sterling Wheelbarrows
Tuthill Hwy. Guard Rail
Wenzel Tarpaulins
Wire Rope Corp. of America
Woolridge Scrapers
Member: Associated Equipment Distributors

NIXON-HASSELLE COMPANY, INC.
Contractors' Equipment
Chattanooga Tennessee
Representing
Archer Towers, Spouting Equipment
Austin-Western Graders, Crushers, Rollers, Scrapers, etc.
Blaw-Knox Batchers, Buckets, Forms, etc.
Bros Tank Car Heaters, etc.
Bucyrus-Erie Bulligraders, etc.
Dobbie Derricks
Four Wheel Drive Trucks
Haiss Loaders, Conveyors, etc.
Hough Road Sweepers, Sprinklers, etc.
Murphy Diesels
Ingersoll-Rand Compressors, Jackhammers, Air Tools, etc.
International TracTracTors, Wheel Tractors & Power Units
John Machinery, Trailers
Lidgerwood Hoists, etc.
Maslend Asphalt Kettles
Mall Vibrating Equipment, Saws, etc.
Newport Culvert Pipe
Northwest Cranes, Shovels
Rex Mixers, Pavers, Pumps, etc.
Timken Detachable Bits
Vulcan Gas Locomotives
Also Wheelbarrows, Carts, Benders, Cutters, Shovels, etc.
Member: Associated Equipment Distributors

R. B. EVERETT & CO.
3112-18 Harrisburg Blvd. Houston, Texas
BLAW-KNOX Road Plant Equipment, Bins, Clamshell Buckets
AMERICAN Hoisting Machinery
"P. & H." Gasoline Cranes
McKIERNAN-TERRY Pile Hammers, etc.
CONNERY Asphalt Equip.
CHAIN BELT Concrete Mixers, Saw Rigs, Pavers
NOVO Engines, Hoists, Pumps
"RED STAR" Wheelbarrows
SAUERMAN Cableways
BATES Wire Ties
PULSOMETER & NYE Steam Pumps
PATENT Safety Swinging Scaffolding
TRU-LAY Wire Rope
BUFFALO-SPRINGFIELD Road Builders
SULLIVAN Compressors
PORTABLE Conveyors
ETNYRE Asphalt Distrs.
FLYNN Surgrader
PAGE Dragline Buckets
MALL Vibrators
Member: Associated Equipment Distributors

WE WOULD LIKE TO HAVE YOU HELP US

keep this Directory of Dealers in construction equipment up to date. Therefore, we would greatly appreciate any suggestions or corrections that you may have to offer.

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Ave. New York

BROOKS EQUIP. & MFG. CO.
Knoxville 408 Davenport Rd. Tennessee
Representing
J. D. Adams Co.
Buckeye Traction Ditcher Co.
Bucyrus-Erie Co.
Burch Corp.
Construction Machy. Co.
Crucible Steel Co.
Davey Compressor Co.
Euclid Road Machy. Co.
Federal Motor Truck Co.
Frank G. Hough Co.
Hercules Co.
Independent Pneu. Tool Co.
International Harvester Co.
C. S. Johnson Co.
Linn Mfg. Corp.
N. P. Nelson Iron Works
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.
Pioneer Engrg. Wks., Inc.
Rosco Mfg. Co.
T. L. Smith Co.—Truck Mixers
Upson-Walton Co.
Member: Associated Equipment Distributors

PHILLIPS MACHINERY CO.
900 East Cary St. Richmond, Va.
Representing
Aeroil Burner Co., Inc.
Austin Machinery Corp.
Broderick & Bascom Rope Co.
Butler Bin Company
Chain Belt Company
Clyde Iron Wks., Inc.
Concrete Surfacing Machy. Co.
Independent Pneumatic Tool Co.
Jackson Mfg. Co.
Manitowoc Engineering Works
Master Vibrator Company
Rogers Brothers Corp.
Sasgen Derrick Co.
Sauerman Brothers, Inc.
Skilsaw, Inc.
Stephens-Adamson Mfg. Co.
Vulcan Iron Works
Member: Associated Equipment Distributors

HUNTER TRACTOR & MACHY. CO.
327 So. 16th St. Milwaukee, Wis.
Exclusive Distributors
Aeroil Burner Co.
American Steel & Wire Co.
Barco Mfg. Co.
Bates Valve Bag Corp.
Beebe Bros.
Blaw-Knox Co.
Buckeye Traction Ditcher Co.
Buffalo-Springfield Roller Co.
Chain Belt Company
Clyde Iron Works, Inc.
Dempster Bros., Inc.
Kelley Electric Mach. Co.
Master Vibrator Co.
Northwest Engrg. Co.
R-B Equipment Co.
Sasgen Derrick Co. (open account)
Sauerman Bros., Inc.
Silent Hoist Winch & Crane Co.
Sullivan Machy. Co.
Syntron Co.
Universal Form Clamp Co.
Vulcan Iron Works
Member: Associated Equipment Distributors

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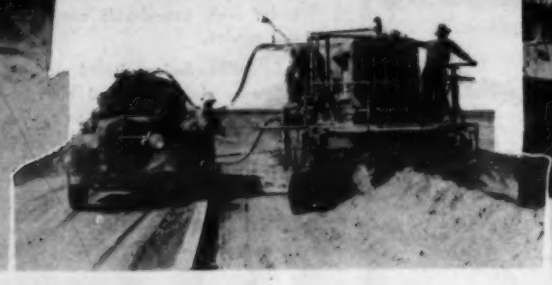
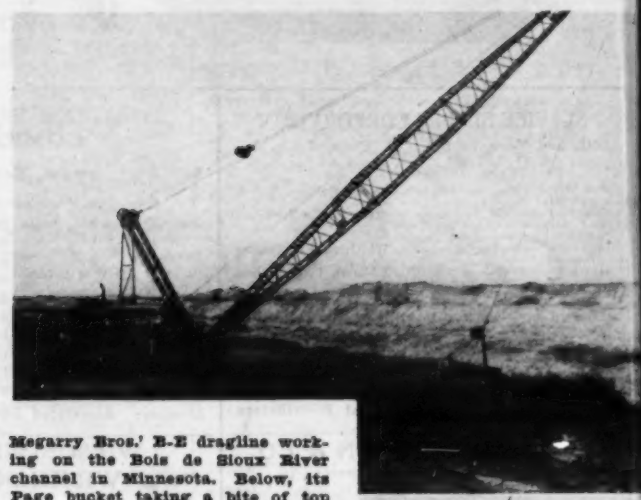


Scenes during the mixing operations on the soil-cement stabilized base for the runways at the Fargo, N. D., airport. Left, a close-up of the screws of the Jaeger mixer. Center, the mixer and the Dodge water truck. Right, delivering the soil-cement mix. See page 1.

C. & E. M. Photos

Traffic striping in South Dakota. Above, the supply truck serves as a rear guard to prevent smearing of the fresh stripe by traffic. Right, the striping truck approaching, leaving a clean even stripe in its wake. Below, the rear of the striper. This outfit, developed by the Maintenance Division of the South Dakota State Highway Department, has proved effective and economical. See page 2.

C. & E. M. Photos



Megarry Bros.' B-E dragline working on the Bois de Sioux River channel in Minnesota. Below, its Page bucket taking a bite of top soil. See page 2.

C. & E. M. Photos

Not a movie set, but actually Mount Hood as seen from Timberline Lodge Road, showing the character of snow removal problems in mountain sections of Oregon. See page 17.

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